NASA SP-7039(38)
Section 1
Abstracts

NASA SP-7039(38) NASA Patent Abstracts Bibliography (Section 1 Abstracts) JANUARY 1991

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY

Section 1 • Abstracts

JANUARY 1991

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

ACCESSION NUMBER RANGES

Bibliography Number	*STAR Accession Numbers*
NASA SP-7039(04) SEC 1	N69-20701 - N73-33931
NASA SP-7039(12) SEC 1	N74-10001 - N77-34042
NASA SP-7039(13) SEC 1	N78-10001 - N78-22018
NASA SP-7039(14) SEC 1	N78-22019 - N78-34034
NASA SP-7039(15) SEC 1	N79-10001 - N79-21993
NASA SP-7039(16) SEC 1	N79-21994 - N79-34158
NASA SP-7039(17) SEC 1	N80-10001 - N80-22254
NASA SP-7039(18) SEC 1	N80-22255 - N80-34339
NASA SP-7039(19) SEC 1	N81-10001 - N81-21997
NASA SP-7039(20) SEC 1	N81-21998 - N81-34139
NASA SP-7039(21) SEC 1	N82-10001 - N82-22140
NASA SP-7039(22) SEC 1	N82-22141 - N82-34341
NASA SP-7039(23) SEC 1	N83-10001 - N83-23266
NASA SP-7039(24) SEC 1	N83-23267 - N83-37053
NASA SP-7039(25) SEC 1	N84-10001 - N84-22526
NASA SP-7039(26) SEC 1	N84-22527 - N84-35284
NASA SP-7039(27) SEC 1	N85-10001 - N85-22341
NASA SP-7039(28) SEC 1	N85-22342 - N85-36162
NASA SP-7039(29) SEC 1	N86-10001 - N86-22536
NASA SP-7039(30) SEC 1	N86-22537 - N86-33262
NASA SP-7039(31) SEC 1	N87-10001 - N87-20170
NASA SP-7039(32) SEC 1	N87-20171 - N87-30248
NASA SP-7039(33) SEC 1	N88-10001 - N88-20253
NASA SP-7039(34) SEC 1	N88-20254 - N88-30583
NASA SP-7039(35) SEC 1	N89-10001 - N89-20085
NASA SP-7039(36) SEC 1	N89-20086 - N89-30155
NASA SP-7039(37) SEC 1	N90-10001 - N90-20043
NASA SP-7039(38) SEC 1	N90-20044 - N90-30170

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NASA SP-7039(38)
Section 1
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NASA

PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY

Section 1 • Abstracts

Annotated references to NASA-owned inventions covered by U.S. patents and applications for patent that were announced in *Scientific and Technical Aerospace Reports (STAR)* between July 1990 and December 1990.

National Aeronautics and Space Administration
Office of Management
Scientific and Technical Information Division
Washington, DC 1991

This supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22161, price code A04.

INTRODUCTION

Several thousand inventions result each year from the aeronautical and space research supported by the National Aeronautics and Space Administration. The inventions having important use in government programs or significant commercial potential are usually patented by NASA. These inventions cover practically all fields of technology and include many that have useful and valuable commercial application.

NASA inventions best serve the interests of the United States when their benefits are available to the public. In many instances, the granting of nonexclusive or exclusive licenses for the practice of these inventions may assist in the accomplishment of this objective. This bibliography is published as a service to companies, firms, and individuals seeking new, licensable products for the commercial market.

The *NASA Patent Abstracts Bibliography (NASA PAB)* is a semiannual NASA publication containing comprehensive abstracts and indexes of NASA-owned inventions covered by U.S. patents and applications for patent. The citations included in *NASA PAB* were originally published in NASA's *Scientific and Technical Aerospace Reports (STAR)* and cover *STAR* announcements made since May 1969.

For the convenience of the user, each issue of *NASA PAB* has a separately bound Abstract Section (Section 1) and Index Section (Section 2). Although each Abstract Section covers only the indicated six-month period, the Index Section is cumulative covering all NASA-owned inventions announced in *STAR* since 1969. Thus a complete set of *NASA PAB* would consist of the Abstract Sections of Issue 04 (January 1974) and Issue 12 (January 1978) and the Abstract Section for all subsequent issues and the Index Section for the most recent issue.

The 132 citations published in this issue of the Abstract Section cover the period July 1990 through December 1990. The Index Section references over 4900 citations covering the period May 1969 through December 1990.

ABSTRACT SECTION (SECTION 1)

This *PAB* issue includes 10 major subject divisions separated into 76 specific categories and one general category/division. (See Table of Contents for the scope note of each category, under which are grouped appropriate NASA inventions.) This scheme was devised in 1975 and revised in 1987 in lieu of the 34 category divisions which were utilized in *PAB* supplements (01) through (06) covering *STAR* abstracts from May 1969 through January 1974. Each entry in the Abstract Section consists of a *STAR* citation accompanied by an abstract and, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in order of the ascending NASA Accession Number originally assigned for *STAR* to the invention. The range of NASA Accession Numbers within each issue is printed on the inside front cover.

Abstract Citation Data Elements: Each of the abstract citations has several data elements useful for identification and indexing purposes, as follows:

NASA Accession Number
NASA Case Number
Inventor's Name
Title of Invention
U.S. Patent Application Serial Number
U.S. Patent Number (for issued patents only)
U.S. Patent Office Classification Number(s)
(for issued patents only)

These data elements are identified in the Typical Citation and Abstract and in the indexes.

INDEX SECTION (SECTION 2)

The Index Section is divided into five indexes. These indexes are cross-indexed and are used to locate a single invention or groups of inventions.

Subject Index: Lists all inventions according to appropriate alphabetized technical term and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Inventor Index: Lists all inventions according to alphabetized names of inventors and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Source Index: Lists all inventions according to alphabetized source of invention (i.e., name of contractor or government installation where invention was made) and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Number Index: Lists inventions in order of ascending (1) NASA Case Number, (2) U.S. Patent Application Serial Number, (3) U.S. Patent Classification Number, and (4) U.S. Patent Number and indicates the related Subject Category Number and the Accession Number.

Accession Number Index: Lists all inventions in order of ascending Accession Number and indicates the related Subject Category Number, the NASA Case Number, the U.S. Patent Application Serial Number, the U.S. Patent Classification Number, and the U.S. Patent Number.

HOW TO USE THIS PUBLICATION TO IDENTIFY NASA INVENTIONS

To identify one or more NASA inventions within a specific technical field or subject, several techniques are possible with the flexibility incorporated into the *NASA PAB.*

(1) *Using Subject Category:* To identify all NASA inventions in any one of the subject categories in this issue of *NASA PAB*, select the desired Subject Category in the Abstract Section (Section 1) and find the inventions abstracted thereunder.

(2) *Using Subject Index:* To identify all NASA inventions listed under a desired technical subject index term, (A) turn to the cumulative Subject Index in the Index Section and find the invention(s) listed under the desired technical subject term. (B) Note the indicated Accession Number and the Subject Category Number. (C) Using the indicated Accession Number, turn to the inside front cover of the Index Section to determine which issue of the Abstract Section includes the Accession Number desired. (D) To find the abstract of the particular invention in the issue of the Abstract Section selected, (1) use the Subject Category Number to locate the Subject Category and (2) use the Accession Number to locate the desired invention within the Subject Category listing.

(3) *Using Patent Classification Index:* To identify all inventions covered by issued NASA patents (not including applications for patent) within a desired Patent Classification, (A) turn to the Patent Classification Number in the Number Index of Section 2 and find the associated invention(s), and (B) follow the instructions outlined in (2)(B), and (D) above.

TYPICAL CITATION AND ABSTRACT

NASA SPONSORED

ACCESSION NUMBER → **N90-21209*** National Aeronautics and Space Administration. ← **CORPORATE SOURCE**
Marshall Space Flight Center, Huntsville, AL.

TITLE → **APPARATUS FOR MIXING SOLUTIONS IN LOW GRAVITY ENVIRONMENTS Patent**

INVENTORS → DANIEL C. CARTER, inventor (to NASA) and MARY B. BROOM, inventor (to NASA) (Universities Space Research Association, Huntsville, AL.) 20 Mar. 1990 8 p Filed 15 Sep. 1988

NASA CASE NUMBER → (NASA-CASE-MFS-26047-1; US-PATENT-4,909,933;

US PATENT APPLICATIONS SERIAL NUMBERS → US-PATENT-APPL-SN-244369; US-PATENT-CLASS-210-95; US-PATENT-CLASS-210-94; US-PATENT-CLASS-210-205; US-PATENT-CLASS-210-247; US-PATENT-CLASS-210-257.1; US-PATENT-CLASS-210-321.6; US-PATENT-CLASS-210-340)

AVAILABILITY SOURCE → Avail: US Patent and Trademark Office CSCL 12A ← **COSATI CODE**

An apparatus is disclosed for allowing mixing of solutions in low gravity environments so as to carry out crystallization of proteins and other small molecules or other chemical syntheses, under conditions that maximize crystal growth and minimize disruptive turbulent effects. The apparatus is comprised of a housing, a plurality of chambers, and a cylindrical rotatable valve disposed between at least two of the chambers, said valve having an internal passageway so as to allow fluid movement between the chambers by rotation of the valve. In an alternate embodiment of the invention, a valve is provided having an additional internal passage way so that fluid from a third chamber can be mixed with the fluids of the first two chambers. This alternate embodiment of the invention is particularly desirable when it is necessary to provide a termination step to the crystal growth, or if a second synthetic step is required.

ABSTRACT ←

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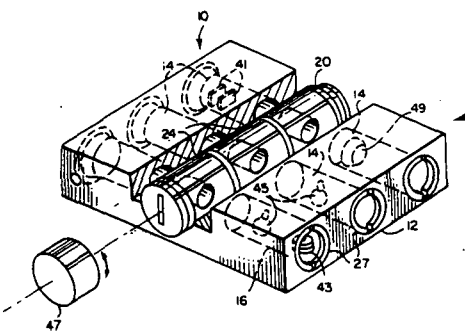


KEY ILLUSTRATION ←

TABLE OF CONTENTS

Section 1 • Abstracts

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics.*

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; space communications, spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics.*

GEOSCIENCES

Includes geosciences (general); earth resources and remote sensing; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.

For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) **N.A.**

43 EARTH RESOURCES AND REMOTE SENSING **35**

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION **N.A.**

Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *28 Propellants and Fuels.*

45 ENVIRONMENT POLLUTION **N.A.**

Includes atmospheric, noise, thermal, and water pollution.

46 GEOPHYSICS **N.A.**

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY **N.A.**

Includes weather forecasting and modification.

48 OCEANOGRAPHY **N.A.**

Includes biological, dynamic, and physical oceanography; and marine resources.

For related information see also *43 Earth Resources and Remote Sensing.*

LIFE SCIENCES

Includes life sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and space biology.

51 LIFE SCIENCES (GENERAL) **36**

52 AEROSPACE MEDICINE **N.A.**

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

53 BEHAVIORAL SCIENCES **N.A.**

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT **37**

Includes human engineering; biotechnology; and space suits and protective clothing.

For related information see also *16 Space Transportation.*

55 SPACE BIOLOGY **N.A.**

Includes exobiology; planetary biology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) **N.A.**

60 COMPUTER OPERATIONS AND HARDWARE **38**

Includes hardware for computer graphics, firmware, and data processing.

For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE **40**

Includes computer programs, routines, algorithms, and specific applications, e.g., CAD/CAM.

62 COMPUTER SYSTEMS **41**

Includes computer networks and special application computer systems.

63 CYBERNETICS **N.A.**

Includes feedback and control theory, artificial intelligence, robotics and expert systems.

For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS **N.A.**

Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY **N.A.**

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS **N.A.**

Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS **N.A.**

Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.

For related information see also *Engineering.*

70 PHYSICS (GENERAL) **N.A.**

For precision time and time interval (PTTI) see *35 Instrumentation and Photography;* for geophysics, astrophysics or solar physics see *46 Geophysics, 90 Astrophysics,* or *92 Solar Physics.*

Note: N.A. means that no abstracts were assigned to this category for this issue.

Section 2 • Indexes

JANUARY 1991 (Supplement 38)

NASA Patent Abstracts Bibliography

A Semiannual Publication of the National Aeronautics and Space Administration

05

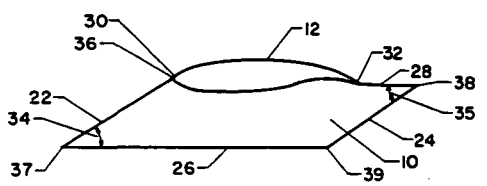
AIRCRAFT DESIGN, TESTING AND PERFORMANCE

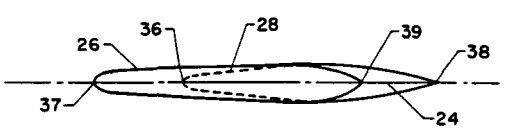
Includes aircraft simulation technology.

N90-20078* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
COMPRESSION PYLON Patent
JAMES C. PATTERSON, JR., inventor (to NASA) 19 Sep. 1989 10 p Filed 23 Jun. 1988
(NASA-CASE-LAR-13777-1; US-PATENT-4,867,394; US-PATENT-APPL-SN-210480; US-PATENT-CLASS-244-54; US-PATENT-CLASS-244-55; US-PATENT-CLASS-244-130)
Avail: US Patent and Trademark Office CSCL 01C

A compression pylon for an aircraft with a wing-mounted engine, that does not cause supersonic airflow to occur within the fuselage-wing-pylon-nacelle channel is presented. The chord length of the pylon is greater than the local chord length of the wing to which it is attached. The maximum thickness of the pylon occurs at a point corresponding to the local trailing edge of the wing. As a result, the airflow through the channel never reaches supersonic velocities.

Official Gazette of the U.S. Patent and Trademark Office





N90-20079* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PASSIVE VENTING TECHNIQUE FOR SHALLOW CAVITIES Patent
ROBERT L. STALLINGS, JR., inventor (to NASA) and FLOYD J. WILCOX, JR., inventor (to NASA) 5 Sep. 1989 5 p Filed 30 Sep. 1988
(NASA-CASE-LAR-14031-1; US-PATENT-4,863,118; US-PATENT-APPL-SN-252081; US-PATENT-CLASS-244-130; US-PATENT-CLASS-244-137.4) Avail: US Patent and Trademark Office CSCL 01C

A device is introduced for reducing drag and store separation difficulties caused by shallow cavities on aircraft in supersonic flight consisting of a group of hollow pipes the same length as the cavity. The pipes are attached to the cavity floor so as to allow air to flow through the pipes. This device allows air to flow through the pipes opposite to the direction of flow outside the pipes. This results in reduced drag and improved store separation characteristics.

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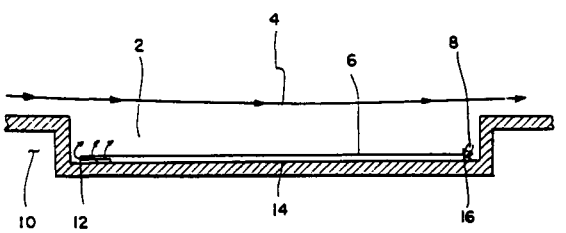
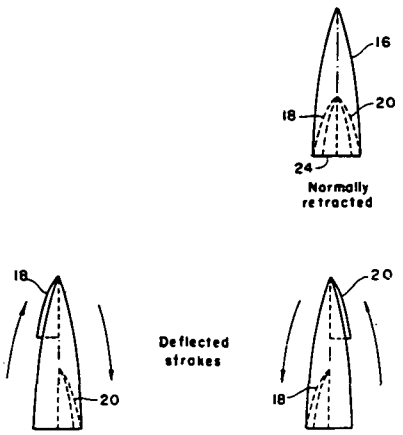


N90-23390* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
ACTUATED FOREBODY STRAKES Patent
DANIEL G. MURRI, inventor (to NASA) 17 Apr. 1990 11 p Filed 11 May 1988 Supersedes N88-24628 (26 - 18, p 2464)
(NASA-CASE-LAR-13983-1; US-PATENT-4,917,333; US-PATENT-APPL-SN-192563; US-PATENT-CLASS-244-75R; US-PATENT-CLASS-244-45A; US-PATENT-CLASS-244-46; US-PATENT-CLASS-244-90R; INT-PATENT-CLASS-B64C-9/02; INT-PATENT-CLASS-B64C-9/08) Avail: US Patent and Trademark Office CSCL 01C

Actuated forebody strakes provide yaw control at high angles of attack. In one embodiment, the strakes are axially slidable in the forebody to be deployed out of slots provided for the strakes in the forebody. In another embodiment, the strakes are pivotally connected at the tip of the strakes to pivot radially outwardly out of the slots provided in the forebody. In another embodiment, the forebody is provided with either a single strake or two strakes and the forebody is rotatable to vary the radial location of the strake or strakes. All embodiments achieve significant yaw control

capability over a wide angle of attack and sideslip ranges.
Official Gazette of the U.S. Patent and Trademark Office



the airplane's present performance with a predicted nominal performance based upon the given conditions.
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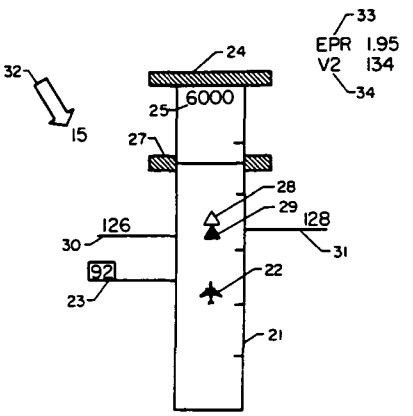


09

RESEARCH AND SUPPORT FACILITIES (AIR)

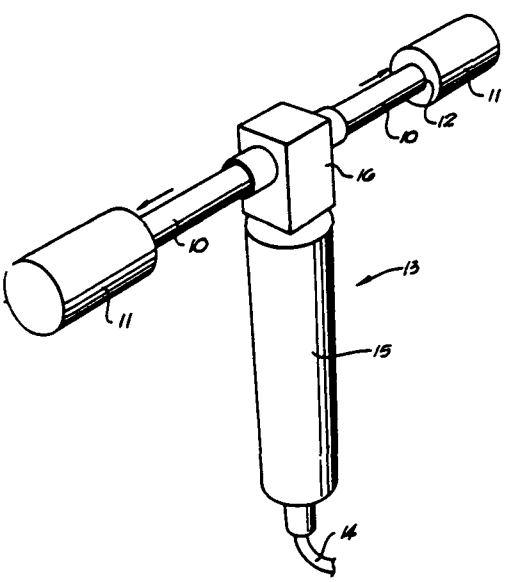
Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tubes; and aircraft engine test stands.

N90-20096* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
AIRPLANE TAKEOFF AND LANDING PERFORMANCE MONITORING SYSTEM Patent
DAVID B. MIDDLETON, inventor (to NASA), RAGHAVACHARI SRIVATSAN, inventor (to NASA), and LEE H. PERSON, inventor (to NASA) 27 Jun. 1989 25 p Filed 6 Aug. 1987 Prepared in cooperation with Kansas Univ., Lawrence
(NASA-CASE-LAR-13734-1-CU; US-PATENT-4,843,554; US-PATENT-APPL-SN-082766; US-PATENT-CLASS-364-427; US-PATENT-CLASS-73-178-T) Avail: US Patent and Trademark Office CSCL 14B

The invention is a real-time takeoff and landing performance monitoring system which provides the pilot with graphic and metric information to assist in decisions related to achieving rotation speed (V sub R) within the safe zone of the runway or stopping the aircraft on the runway after landing or take off abort. The system processes information in two segments: a pretakeoff segment and a real-time segment. One-time inputs of ambient conditions and airplane configuration information are used in the pretakeoff segment to generate scheduled performance data. The real-time segment uses the scheduled performance data, runway length data and transducer measured parameters to monitor the performance of the airplane throughout the takeoff roll. An important feature of this segment is that it updates the estimated runway rolling friction coefficient. Airplane performance predictions also reflect changes in headwind occurring as the takeoff roll progresses. The system displays the position of the airplane on the runway, indicating runway used and runway available, summarizes the critical information into a situation advisory flag, flags engine failures and off-nominal acceleration performance, and indicates where on the runway particular events such as decision speed (V sub 1), rotation speed (V sub R) and expected stop points will occur based on actual or predicted performance. The display also indicates airspeed, wind vector, engine pressure ratios, second segment climb speed, and balanced field length (BFL). The system detects performance deficiencies by comparing

N90-23415* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
HIGH TEMPERATURE ELECTRIC ARC FURNACE AND METHOD Patent
RICHARD M. POORMAN, inventor (to NASA) and DEBORAH D. SCHMIDT, inventor (to NASA) 20 Feb. 1990 6 p Filed 13 Jun. 1988 Supersedes N88-28938 (26 - 23, p 3181)
(NASA-CASE-MFS-28281-1; US-PATENT-4,902,354; US-PATENT-APPL-SN-205898; US-PATENT-CLASS-148-4; US-PATENT-CLASS-148-149; US-PATENT-CLASS-148-902; US-PATENT-CLASS-148-903; INT-PATENT-CLASS-C21D-1/09)
Avail: US Patent and Trademark Office CSCL 14B

An apparatus and process for improving the microstructure of electrically conducting materials is disclosed by the present invention. A revolving heat source applies heat to the surface of the material evenly and quickly. One or more heat sinks quickly cool the material. In the preferred embodiment, the cooling may be done in such a way as to promote as high a degree of directional grain growth as desired or completely nondirectional grain growth.
Official Gazette of the U.S. Patent and Trademark Office



16

SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques.

N90-22584* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
EARTH-TO-ORBIT VEHICLE PROVIDING A REUSABLE ORBITAL STAGE Patent
JAMES A. MARTIN, inventor (to NASA) 5 Dec. 1989 8 p Filed 23 Jul. 1987 Supersedes N87-29582 (25 - 24, p 3278)
(NASA-CASE-LAR-13486-1; US-PATENT-APPL-SN-076955; US-PATENT-CLASS-244-158R; US-PATENT-CLASS-244-160; US-PATENT-CLASS-244-161; US-PATENT-CLASS-244-172; INT-PATENT-CLASS-B64G-1/14; US-Patent-4,884,770) Avail: US Patent and Trademark Office CSCL 22B

A reusable Earth-to-orbit vehicle is described with an orbital stage sized to fit into a payload bay equipped, Earth-return-capable space vehicle such as the United States Space Shuttle. The orbital stage is equipped with a reusable rocket engine capable of operation from the Earth's surface to Earth orbit. The orbital stage propels itself into Earth orbit with the help of boosters that separate and return to Earth before orbit is reached. After delivering its payload, the orbital stage is placed in the Earth-return-capable space vehicle's payload bay and returned to Earth for reuse.

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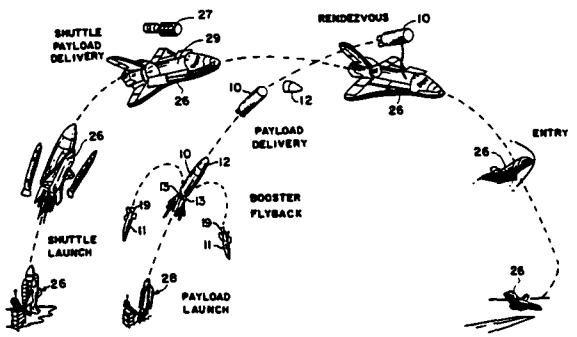


17

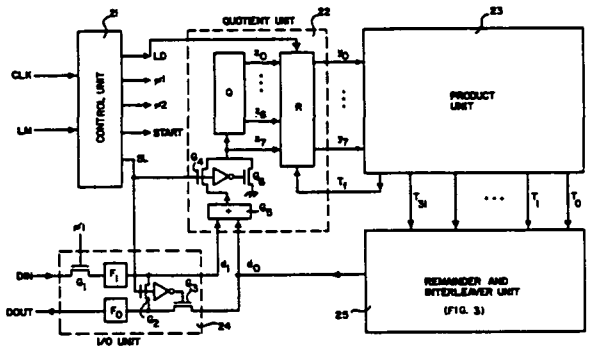
SPACE COMM., SPACECRAFT COMM., COMMAND & TRACKING

Includes telemetry; space communications networks; astronavigation and guidance; and radio blackout.

N90-21061* National Aeronautics and Space Administration. Pasadena Office, CA.
VLSI SINGLE-CHIP (255,223) REED-SOLOMON ENCODER WITH INTERLEAVER Patent
IN-SHEK HSU, inventor (to NASA), LESLIE J. DEUTSCH, inventor (to NASA), TRIEU-KIE TRUONG, inventor (to NASA), and IRVING S. REED, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 6 Mar. 1990 15 p Filed 18 May 1988 Supersedes N88-27220 (26 - 21, p 2902)
(Contract NAS7-918)
(NASA-CASE-NPO-17280-1-CU; US-PATENT-4,907,233; US-PATENT-APPL-SN-195226; US-PATENT-CLASS-371-37.4; US-PATENT-CLASS-371-38.1; US-PATENT-CLASS-371-041; US-PATENT-CLASS-371-043) Avail: US Patent and Trademark Office CSCL 09F

The invention relates to a concatenated Reed-Solomon/convolutional encoding system consisting of a Reed-Solomon outer code and a convolutional inner code for downlink telemetry in space missions, and more particularly to a Reed-Solomon encoder with programmable interleaving of the information syumbols and code correction symbols to combat error bursts in the Viterbi decoder.

Official Gazette of the U.S. Patent and Trademark Office NASA



18

SPACECRAFT DESIGN, TESTING AND PERFORMANCE

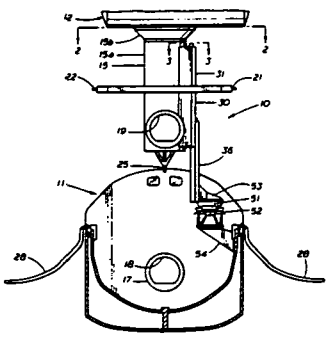
Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls.

N90-20126* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
DOCKING MECHANISM FOR SPACECRAFT Patent
GREGORY A. LANGE, inventor (to NASA), JOHN P. MCMANAMEN, inventor (to NASA), and JOHN A. SCHLIESING, inventor (to NASA) 22 Aug. 1989 14 p Filed 30 Dec. 1988
(NASA-CASE-MSC-21386-1; US-PATENT-4,858,857; US-PATENT-APPL-SN-292123; US-PATENT-CLASS-244-161; US-PATENT-CLASS-244-159; US-PATENT-CLASS-405-188; US-PATENT-CLASS-166-343) Avail: US Patent and Trademark Office CSCL 22B

A system is presented for docking a space vehicle to a space station where a connecting tunnel for in-flight transfer of personnel is required. Cooperable coupling mechanisms include docking rings on the space vehicle and space station. The space station is provided with a tunnel structure, a retraction mechanism, and a docking ring. The vehicle coupling mechanism is designed to capture the station coupling mechanism, arrest relative spacecraft motions while limiting loads to acceptable levels, and then realign the spacecraft for final docking and tunnel interconnection. The docking ring of the space vehicle coupling mechanism is supported by linear attentuator actuator devices, each of which is controlled by a control system which receives loading information signals and attenuator stroke information signals from each device and supplies output signals for controlling its linear actuation to attenuate impact loading or to realign the spacecraft for final docking and tunnel interconnection. The retraction mechanism is used to draw the spacecraft together after initial contact and

coupling. Tunnel trunnions, cooperative with the latches on the space vehicle constitute the primary structural tie between the spacecraft in final docked configuration.

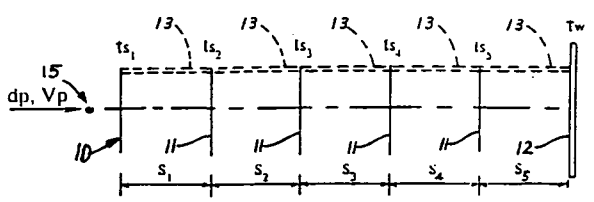
Official Gazette of the U.S. Patent and Trademark Office



N90-26858*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
HYPERVELOCITY IMPACT SHIELD Patent Application
BURTON G. COUR-PALAIS, inventor (to NASA) and JEANNE LEE CREWS, inventor (to NASA) 30 Apr. 1990 24 p
(NASA-CASE-MSC-21420-1; NAS 1.71:MSC-21420-1; US-PATENT-APPL-SN-516573) Avail: NTIS HC A03/MF A01
CSCL 22B

A hypervelocity impact shield and method for protecting a wall structure, such as a spacecraft wall, from impact with particles of debris having densities of about 2.7 g/cu cm and impact velocities up to 16 km/s are disclosed. The shield comprises a stack of ultra thin sheets of impactor disrupting material supported and arranged by support means in spaced relationship to one another and mounted to cover the wall in a position for intercepting the particles. The sheets are of a number and spacing such that are impacting particle and the resulting particulates of the impacting particle and sheet material are successively impact-shocked to a thermal state of total melt and/or vaporization to a degree as precludes perforation of the wall. The ratio of individual sheet thickness to the theoretical diameter of particles of debris which may be of spherical form is in the range of 0.03 to 0.05. The spacing between adjacent sheets is such that the debris cloud plume of liquid and vapor resulting from an impacting particle penetrating a sheet does not puncture the next adjacent sheet prior to the arrival thereat of fragment particulates of sheet material and the debris particle produced by a previous impact.

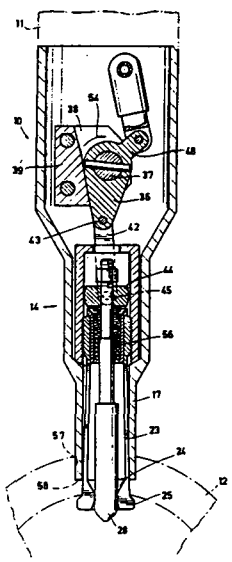
NASA



N90-26859*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
OVERCENTER COLLET SPACE STATION TRUSS FASTENER Patent Application
PHILIP L. SHERIDAN, inventor (to NASA) 30 Apr. 1990 18 p
(NASA-CASE-MSC-21504-1; NAS 1.71:MSC-21504-1; US-PATENT-APPL-SN-516856) Avail: NTIS HC A03/MF A01
CSCL 22B

A quick-connect fastener is arranged with a tubular body that is arranged to be engaged against the exterior surface of a hollow attachment fitting and coincidentally aligned with an opening in the fitting. A collet having normally-contracted fingers with outwardly-enlarged ends is operatively arranged in the body to be moved forwardly by an expander member mounted in the tubular body for advancing the collet fingers through the opening in the attachment fitting. Biasing means are arranged between the expander member and a toggle linkage in the tubular body which is selectively operated to urge the expander member forwardly into engagement with the collet fingers with an initial biasing force to advance their forward portions through the body opening and then expand them outwardly. The biasing means also provide a subsequent biasing force for retaining the collet members in their expanded positions once their enlarged forward end portions are on the opposite side of the body.

NASA

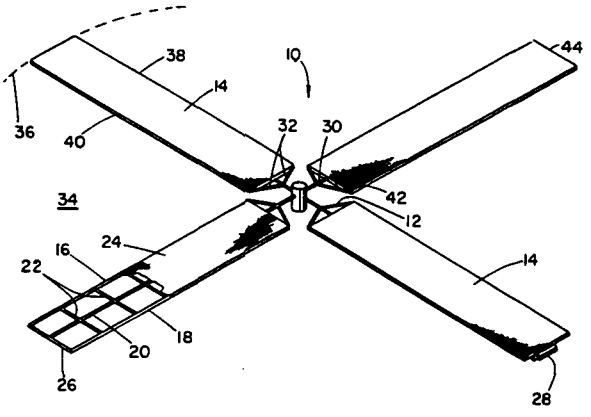


N90-26860*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
SEMI-ACTIVE ORBITAL DEBRIS SWEEPER Patent Application
ANDREW J. PETRO, inventor (to NASA) 16 Feb. 1990 16 p
(NASA-CASE-MSC-21534-1; NAS 1.71:MSC-21534-1; US-PATENT-APPL-SN-480985) Avail: NTIS HC A03/MF A01
CSCL 22B

An orbital debris sweeper is provided for removing particles from orbit which otherwise may impact and damage an orbiting spacecraft. The debris sweeper includes a central sweeper core which carries a debris monitoring unit, and a plurality of large area impact panels rotatable about a central sweeper rotational axis. In response to information from the debris monitoring unit, a computer determines whether individual monitored particles preferably impact one of the rotating panels or pass between the rotating panels. A control unit extends or retracts one or more booms which interconnect the sweeper core and the panels to change the moment of inertia of the sweeper and thereby the rotational velocity of the rotating panels. According to the method of the present invention, the change in panel rotational velocity increases the frequency of particles which desirably impact one of the panels and are thereby removed from orbit, while large particles which may damage the impact panels pass between the

trailing edge of one panel and the leading edge of the rotationally succeeding panel.

NASA



N90-26861*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
CLOSED-LOOP AUTONOMOUS DOCKING SYSTEM Patent Application
RICHARD DABNEY, inventor (to NASA) and RICHARD HOWARD, inventor (to NASA) 20 Feb. 1990 29 p
(NASA-CASE-MFS-28421-1; NAS 1.71:MFS-28421-1; US-PATENT-APPL-SN-481537) Avail: NTIS HC A03/MF A01 CSCL 22B

An autonomous docking system is provided which produces commands for the steering and propulsion system of a chase vehicle used in the docking of that chase vehicle with a target vehicle. The docking system comprises a passive optical target affixed to the target vehicle and comprising three reflective areas including a central area mounted on a short post, and tracking sensor and process controller apparatus carried by the chase vehicle. The latter apparatus comprises a laser diode array for illuminating the target so as to cause light to be reflected from the reflective areas of the target; a sensor for detecting the light reflected from the target and for producing an electrical output signal in accordance with an image of the reflected light; a signal processor for processing the electrical output signal in accordance with an image of the reflected light; a signal processor for processing the electrical output signal and for producing, based thereon, output signals relating to the relative range, roll, pitch, yaw, azimuth and elevation of the chase and target vehicles; and a docking process controller, responsive to the output signals produced by the signal processor, for producing command signals for controlling the steering and propulsion system of the chase vehicle.

NASA

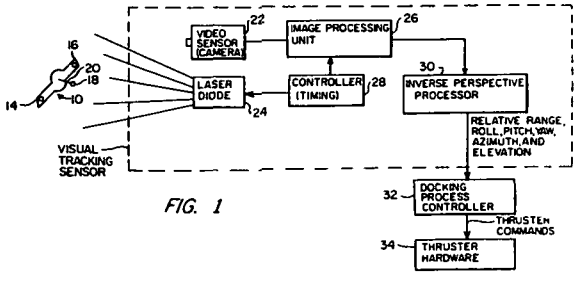


FIG. 1

20

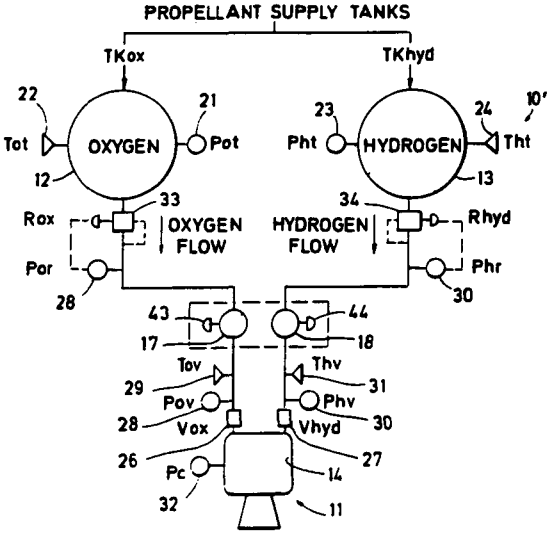
SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

N90-26073*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
METHODS AND APPARATUS FOR PROVIDING REAL-TIME CONTROL OF A GASEOUS PROPELLANT ROCKET PROPULSION SYSTEM Patent Application
BRIAN G. MORRIS, inventor (to NASA) 26 Jan. 1990 33 p
(NASA-CASE-MSC-21542-1; NAS 1.71:MSC-21542-1; US-PATENT-APPL-SN-470480) Avail: NTIS HC A03/MF A01 CSCL 21H

The new and improved methods and apparatus disclosed provide effective real-time management of a spacecraft rocket engine powered by gaseous propellants. Real-time measurements representative of the engine performance are compared with predetermined standards to selectively control the supply of propellants to the engine for optimizing its performance as well as efficiently managing the consumption of propellants. A priority system is provided for achieving effective real-time management of the propulsion system by first regulating the propellants to keep the engine operating at an efficient level and thereafter regulating the consumption ratio of the propellants. A lower priority level is provided to balance the consumption of the propellants so significant quantities of unexpended propellants will not be left over at the end of the scheduled mission of the engine.

NASA



23

CHEMISTRY AND MATERIALS (GENERAL)

N90-20133* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
THE 1-((DIORGANOOXYPHOSPHONYL)-METHYL)-2,4- AND -2,6-DIAMIDO BENZENES Patent
JOHN A. MIKROYANNIDIS, inventor (to NASA) and DEMETRIUS A. KOURTIDES, inventor (to NASA) (National Academy of Sciences - National Research Council, Washington, DC.) 5 Sep. 1989 7 p Filed 28 May 1987 Division of US-Patent-4,689,421, US-Patent-Appl-SN-641152, filed 16 Aug. 1984; Continuation-in-part of US-Patent-Appl-SN-522629, filed 12 Aug. 1983, abandoned; and of US-PATENT-APPL-SN-493864, filed 12 May 1983, abandoned (NASA-CASE-ARC-11425-4; US-PATENT-4,864,050; US-PATENT-APPL-SN-054985; US-PATENT-APPL-SN-641152; US-PATENT-APPL-SN-522629; US-PATENT-APPL-SN-493864; US-PATENT-CLASS-558-190) Avail: US Patent and Trademark Office CSCL 07A

1-((Diorgano oxyphosphonyl) methyl)-2,4- and -2,6-dinitro and diamino benzenes are prepared by nitrating an (organophosphonyl) methyl benzene to produce the dinitro compounds which are then reduced to the diamino compounds. The organo grounds (alkyl, haloalkyl, aryl) on the phosphorus may be removed to give the free acids (HO)2P(double bond O)single bond. The diamino compounds may be polymerized with dianhydrides or diacyl halides to produce fire and flame resistant polymers which are useful in the manufacture of aircraft structures.

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N90-21118* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
BIS(4-(3,4-DIMETHYLENEPYRROLIDYL)-PHENYL) METHANE Patent
RAPHAEL M. OTTENBRITE, inventor (to NASA) (Virginia Commonwealth Univ., Richmond.) 25 Jul. 1989 6 p Filed 19 Jul. 1988
(Contract NAG1-672)
(NASA-CASE-LAR-13965-1-CU; US-PATENT-4,851,544; US-PATENT-APPL-SN-221386; US-PATENT-CLASS-548-524; US-PATENT-CLASS-526-262; US-PATENT-CLASS-528-322; US-PATENT-CLASS-548-400) Avail: US Patent and Trademark Office CSCL 07A

It is the primary object of the present invention to prepare high temperature polymeric materials, especially linear aromatic polyimides, which maintain their integrity and toughness during long exposure times at elevated temperatures. According to the present invention, this object is achieved, and the attending benefits are obtained, by first providing the bis(exocyclodiene) bis(4-(3,4-dinethylene pyrrolidyl) phenyl) methane, which is formed from the monomer N-phenyl 3,4-dimethylene pyrrolidine. This bis-(exocyclodiene) undergoes Diels-Alder reaction with a bismaleimide without the evolution of gaseous by-products, to form the aromatic polyimide.

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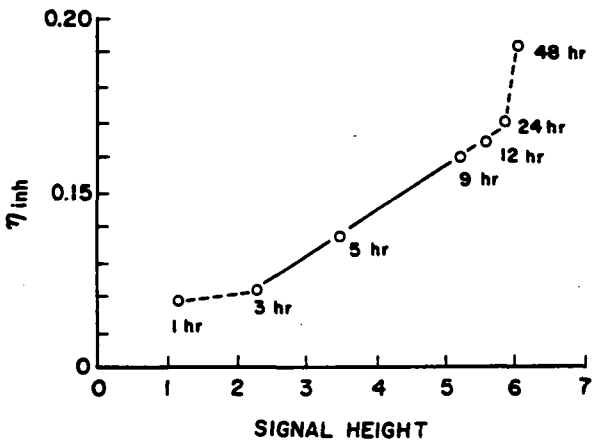

N90-23475* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
SOME 1-(DIORGANOOXYPHOSPHONYL)METHYL-2,4- AND -2,6-DINITRO-BENZENES Patent
JOHN A. MIKROYANNIDIS, inventor (to NASA) (Patras Univ., Greece) and DEMETRIUS A. KOURTIDES, inventor (to NASA) 12 Dec. 1989 7 p Filed 28 May 1987 Division of US-Patent-Appl-SN-641152, filed 16 Aug. 1984 which is a continuation-in-part of abandoned US-Patent-Appl-SN-522629, filed 12 Aug. 1983 which is a continuation-in-part of abandoned US-Patent-Appl-SN-493864, filed 12 May 1983
(NASA-CASE-ARC-11425-3; US-PATENT-4,886,896; US-PATENT-APPL-SN-054982; US-PATENT-APPL-SN-641152; US-PATENT-APPL-SN-522629; US-PATENT-APPL-SN-493864; US-PATENT-CLASS-558-193; INT-PATENT-CLASS-C07S-9/40) Avail: US Patent and Trademark Office CSCL 07A

1-(Diorgano oxyphosphonyl) methyl) 2,4- and 2,6-dinitro- and diamino benzenes are prepared by nitrating an (organophosphonyl)methyl benzene to produce the dinitro compounds which are then reduced to the diamino compounds. The organo group (alkyl, haloalkyl, aryl) on the phosphorus may be removed to give the free acids, (HO)2P(double bond O) single bond. The diamino compounds may be polymerized with dianhydrides or diacyl halides to produce fire and flame resistant polymers which are useful in the manufacture of aircraft structures.

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COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

N90-21822* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
IMPACT TOLERANT MATERIAL Patent
JOSEPH S. HEYMAN, inventor (to NASA) 27 Mar. 1990 7 p Filed 15 Mar. 1989
(NASA-CASE-LAR-12887-3; US-PATENT-4,911,062; US-PATENT-APPL-SN-323236; US-PATENT-CLASS-89-36.02; US-PATENT-CLASS-181-286; US-PATENT-CLASS-181-290)
Avail: US Patent and Trademark Office CSCL 11D

A material is protected from acoustic shock waves generated by impacting projectiles by means of a backing. The backing has an acoustic impedance that efficiently couples the acoustic energy out of the material.

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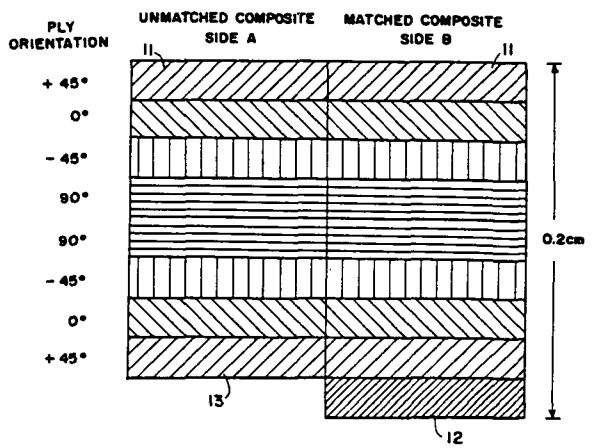

N90-23480* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
HIGH TEMPERATURE INSULATION BARRIER COMPOSITE Patent
JOSEPH W. ONSTOTT, inventor (to NASA) (Rockwell International Corp., Canoga Park, CA.) 31 Oct. 1989 6 p Filed 30 Sep. 1988
(NASA-CASE-MFS-29241-1; US-PATENT-4,877,689; US-PATENT-APPL-SN-252078; US-PATENT-CLASS-428-607; US-PATENT-CLASS-428-623; US-PATENT-CLASS-428-627; US-PATENT-CLASS-428-632; US-PATENT-CLASS-428-666; US-PATENT-CLASS-428-680; US-PATENT-CLASS-244-158A)
Avail: US Patent and Trademark Office CSCL 11D

A composite material suitable for providing insulation for the nozzle structure of the Space Shuttle and other similar surfaces is disclosed. The composite layer is comprised of an outer skin layer of nickel chromium and an interleaved inner region comprising a top layer of nickel chromium foil which acts as a primary convective shield. There are at least two layers of alumina batting adjacent to the layers of silicon carbide fabric. An additional layer of nickel chromium foil is used as a secondary convective shield. The composite is particularly advantageous for use as nozzle insulation because of its ability to withstand high reentry temperatures, its flexibility, oxidation resistance, low conductivity, and light weight.

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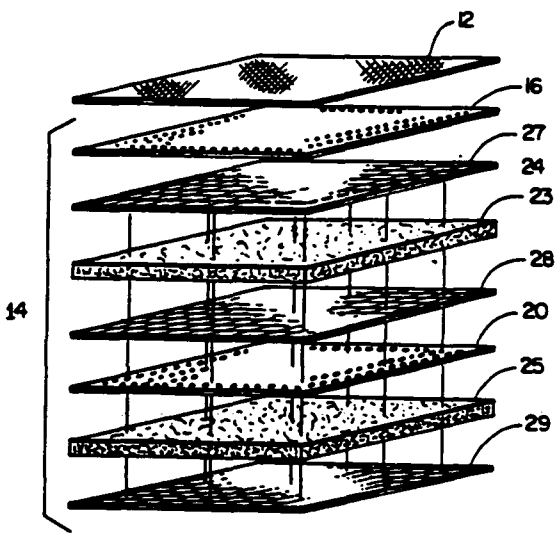

N90-23493* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
ONE STEP HIP CANNING OF POWDER METALLURGY COMPOSITES Patent
JOHN J. JUHAS, inventor (to NASA) 27 Feb. 1990 8 p Filed 21 Mar. 1989
(NASA-CASE-LEW-14719-1; US-PATENT-4,904,538; US-PATENT-APPL-SN-326757; US-PATENT-CLASS-428-552; US-PATENT-CLASS-75-228; US-PATENT-CLASS-428-551; US-PATENT-CLASS-419-8; US-PATENT-CLASS-419-24; US-PATENT-CLASS-419-36; US-PATENT-CLASS-419-37) Avail: US Patent and Trademark Office CSCL 11D

A single step is relied on in the canning process for hot isostatic pressing (HIP) powder metallurgy composites. The binders are totally removed while the HIP can of compatible refractory metal is sealed at high vacuum and temperature. This eliminates outgassing during hot isostatic pressing.

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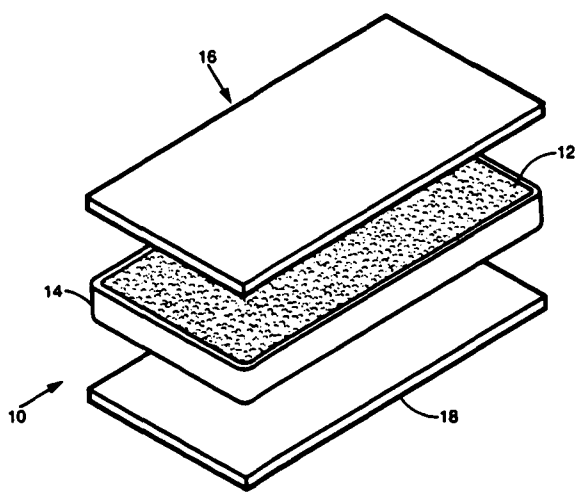

N90-25196* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SEAMLESS METAL-CLAD FIBER-REINFORCED ORGANIC MATRIX COMPOSITE STRUCTURES AND PROCESS FOR THEIR MANUFACTURE Patent
RAYMOND M. BLUCK, inventor (to NASA), HAROLD G. BUSH, inventor (to NASA), and ROBERT R. JOHNSON, inventor (to NASA) 8 May 1990 7 p Filed 21 Oct. 1986 Supersedes N87-18613 (25 - 11, p 1449)
(NASA-CASE-LAR-13562-1; US-PATENT-4,923,751; US-PATENT-APPL-SN-921572; US-PATENT-CLASS-428-35.9; US-PATENT-CLASS-138-141; US-PATENT-CLASS-138-149; US-PATENT-CLASS-138-153; US-PATENT-CLASS-428-367; US-PATENT-CLASS-428-376; US-PATENT-CLASS-428-379)
Avail: US Patent and Trademark Office CSCL 11D

A metallic outer sleeve is provided which is capable of enveloping a hollow metallic inner member having continuous reinforcing fibers attached to the distal end thereof. The inner member is then introduced into outer sleeve until inner member is completely enveloped by outer sleeve. A liquid matrix member is then injected into space between inner member and outer sleeve. A pressurized heat transfer medium is flowed through the inside of inner member, thereby forming a fiber reinforced matrix composite material. The wall thicknesses of both inner member and outer sleeve are then reduced to the appropriate size by chemical etching, to adjust the thermal expansion coefficient of the metal-clad composite structure to the desired value. thereby forming a fiber reinforced matrix composite material. The wall thicknesses of both inner member and outer sleeve are then reduced to the appropriate size by chemical etching, to adjust the thermal expansion coefficient of the metal-clad composite structure to the desired value. The novelty of this invention resides in the development of a efficient method of producing seamless metal clad fiber reinforced organic matrix composite structures.

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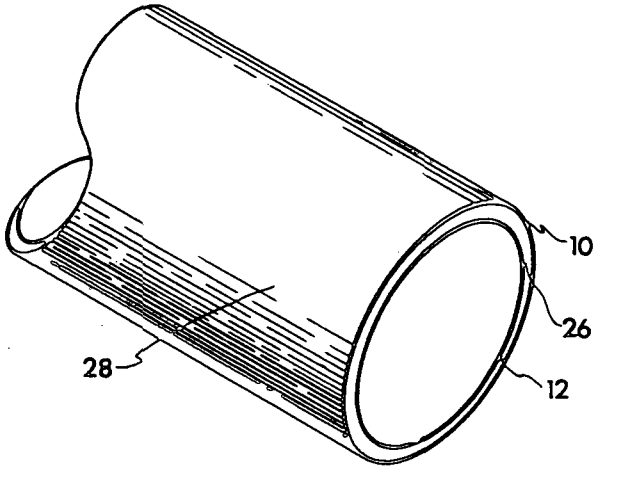

N90-25197* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD OF INSETTING PREDESIGNED DISBOND AREAS INTO COMPOSITE LAMINATES Patent
GEORGE E. DICKERSON, inventor (to NASA) 8 May 1990 3 p Filed 23 Sep. 1988 Supersedes N89-14258 (27 - 6, p 731)
(NASA-CASE-LAR-13225-1; US-PATENT-4,923,545; US-PATENT-APPL-SN-248018; US-PATENT-CLASS-156-153; US-PATENT-CLASS-156-249; US-PATENT-CLASS-156-289; US-PATENT-CLASS-156-344; US-PATENT-CLASS-427-272; US-PATENT-CLASS-427-282; US-PATENT-CLASS-427-290)
Avail: US Patent and Trademark Office CSCL 11D

This invention is a process for producing composite laminates containing interlaminar disbonds of controlled sizes, shapes, and positions within a composite structure. A composite layer is provided for later inclusion within a laminate. The surfaces of this composite layer are solvent cleaned and sandblasted, except in desired disbond areas, which are coated with a releasing surface. A template to mask the bond areas is employed to obtain disbond areas of controlled shapes and sizes. The resulting composite layer is then used in the subsequent manufacture of a laminate, whereby faulty adhesion in the laminate can be studied with prior knowledge of the size, shape, and location of the disbond areas.

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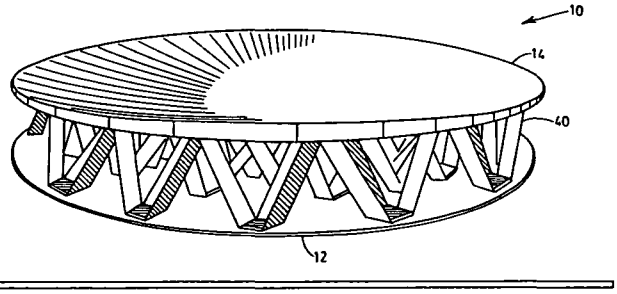
N90-26880*# National Aeronautics and Space Administration. Pasadena Office, CA.
NEW CORE DESIGN FOR USE WITH PRECISION COMPOSITE REFLECTORS Patent Application
CHRISTOPHER C. PORTER, inventor (to NASA), PAUL J. JACOY, inventor (to NASA), and WESLEY P. SCHMITIGAL, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 30 Mar. 1990 21 p
(Contract NAS7-918)
(NASA-CASE-NPO-17858-1-CU; NAS 1.71:NPO-17858-1-CU; US-PATENT-APPL-SN-503487) Avail: NTIS HC A03/MF A01 CSCL 11D

A uniformly flexible core, and method for manufacturing the same, is disclosed for use between the face plates of a sandwich structure. The core is made of a plurality of thin corrugated strips, the corrugations being defined by a plurality of peaks and valleys connected to one another by a plurality of diagonal risers. The corrugated strips are orthogonally criss-crossed to form the core. The core is particularly suitable for use with high accuracy spherically curved sandwich structures because undesirable stresses in the curved face plates are minimized due to the uniform flexibility characteristics of the core in both the X and Y directions. The core is self venting because of the open geometry of the corrugations. The core can be made from any suitable composite, metal, or polymer. Thermal expansion problems in sandwich structures may be minimized by making the core from the same composite materials that are selected in the manufacture of the curved face plates because of their low coefficients of thermal expansion. Where the strips are made of a composite material, the core may be constructed by first cutting an already cured corrugated sheet into a plurality of corrugated strips and then secondarily bonding the strips to one another or, alternatively, by lying a plurality of uncured strips orthogonally over one another in a suitable jig and then curing and bonding the entire plurality of strips to one another in a single operation.

NASA



N90-26881*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A TOUGH HIGH PERFORMANCE COMPOSITE MATRIX Patent Application
RUTH H. PATER, inventor (to NASA) and NORMAN J. JOHNSTON, inventor (to NASA) 31 Oct. 1989 29 p
(NASA-CASE-LAR-14338-1; NAS 1.71:LAR-14338-1; US-PATENT-APPL-SN-429514) Avail: NTIS HC A03/MF A01 CSCL 11D

This invention is a semi-interpenetrating polymer network which includes a high performance thermosetting polyimide having a nadic end group acting as a crosslinking site and a high performance linear thermoplastic polyimide. Provided is an improved high

temperature matrix resin which is capable of performing in the 200 to 300 C range. This resin has significantly improved toughness and microcracking resistance, excellent processability, mechanical performance and moisture and solvent resistances.

NASA

25

INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

N90-20154* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
ISOTOPE EXCHANGE IN OXIDE-CONTAINING CATALYST Patent
KENNETH G. BROWN, inventor (to NASA), BILLY T. UPCHURCH, inventor (to NASA) (Chemicon Corp., Virginia Beach, VA.), ROBERT V. HESS, inventor (to NASA), IRVIN M. MILLER, inventor (to NASA), DAVID R. SCHRYER, inventor (to NASA), BARRY D. SIDNEY, inventor (to NASA), GEORGE M. WOOD, inventor (to NASA), and RONALD F. HOYT, inventor (to NASA) 13 Jun. 1989 5 p Filed 15 Jan. 1988
(NASA-CASE-LAR-13542-2-SB; US-PATENT-4,839,330; US-PATENT-APPL-SN-145719; US-PATENT-CLASS-502-53; US-PATENT-CLASS-204-157.51; US-PATENT-CLASS-372-59; US-PATENT-CLASS-502-38; US-PATENT-CLASS-502-339; US-PATENT-CLASS-502-352) Avail: US Patent and Trademark Office CSCL 07D

A method of exchanging rare-isotope oxygen for common-isotope oxygen in the top several layers of an oxide-containing catalyst is disclosed. A sample of an oxide-containing catalyst is exposed to a flowing stream of reducing gas in an inert carrier gas at a temperature suitable for the removal of the reactive common-isotope oxygen atoms from the surface layer or layers of the catalyst without damaging the catalyst structure. The reduction temperature must be higher than any at which the catalyst will subsequently operate. Sufficient reducing gas is used to allow removal of all the reactive common-isotope oxygen atoms in the top several layers of the catalyst. The catalyst is then reoxidized with the desired rare-isotope oxygen in sufficient quantity to replace all of the common-isotope oxygen that was removed.

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N90-20180* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PROCESS FOR MAKING A NOBLE METAL ON TIN OXIDE CATALYST Patent
BILLY T. UPCHURCH, inventor (to NASA), PATRICIA DAVIS, inventor (to NASA), and IRVIN M. MILLER, inventor (to NASA) (Science and Technology Corp., Hampton, VA.) 8 Aug. 1989 10 p Filed 31 Aug. 1987
(NASA-CASE-LAR-13741-1-SB; US-PATENT-4,855,274; US-PATENT-APPL-SN-090874; US-PATENT-CLASS-502-339; US-PATENT-CLASS-502-325; US-PATENT-CLASS-502-344) Avail: US Patent and Trademark Office CSCL 07D

A quantity of reagent grade tin metal or compound, chloride-free, and high-surface-area silica spheres are placed in deionized water, followed by deaerating the mixture by boiling and adding an oxidizing agent, such as nitric acid. The nitric acid oxidizes the tin to metastannic acid which coats the spheres because the acid is absorbed on the substrate. The metastannic acid becomes tin oxide upon drying and calcining. The tin-oxide coated silica spheres are then placed in water and boiled. A chloride-free precious metal compound in aqueous solution is then added to the mixture containing the spheres, and the precious metal compound is reduced to a precious metal by use of a suitable reducing agent such as formic acid. Very beneficial results were obtained using the precious metal compound tetraammine platinum(II) hydroxide.

Official Gazette of the U.S. Patent and Trademark Office

N90-23497* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
SUBSTITUTED 1,1,1-TRIARYL-2,2,2-TRIFLUOROETHANES AND PROCESSES FOR THEIR SYNTHESIS Patent
WILLIAM B. ALSTON, inventor (to NASA) and ROY F. GRATZ, inventor (to NASA) (Mary Washington Coll., Fredricksburg, VA.) 5 Dec. 1989 12 p Filed 23 Feb. 1988 Division of US-Patent-Appl-SN-924474, filed 29 Oct. 1986
(NASA-CASE-LEW-14345-2; US-PATENT-4,885,116; US-PATENT-APPL-SN-159071; US-PATENT-APPL-SN-924474; US-PATENT-CLASS-562-413; US-PATENT-CLASS-260-395; US-PATENT-CLASS-260-386; US-PATENT-CLASS-549-241; US-PATENT-CLASS-562-415; US-PATENT-CLASS-562-417) Avail: US Patent and Trademark Office CSCL 07D

Synthetic procedures are disclosed for tetraalkyls, tetraacids, and dianhydrides substituted 1,1,1-triaryl 2,2,2-trifluoroethanes which comprises: (1) 1,1-bis (dialkylaryl) 1-aryl 2,2,2-trifluoroethane, (2) 1,1-bis (dicarboxyaryl) 1-aryl 2,2,2-trifluoroethane, or (3) cyclic dianhydride or diamine of 1,1-bis (dialkylaryl) 1-aryl 2,2,2-trifluoroethanes. The synthesis of (1) is accomplished by the condensation reaction of an aryltrifluoromethyl ketone with a dialkylaryl compound. The synthesis of (2) is accomplished by the oxidation of (1). The synthesis dianhydride of (3) is accomplished by the conversion of (2) to its corresponding cyclic dianhydride. The synthesis of the diamine is accomplished by the similar reaction of an aryltrifluoromethyl ketone with aniline or aklyl substituted or disubstituted anilines. Also, other derivatives of the above are formed by nucleophilic displacement reactions.

Official Gazette of the U.S. Patent and Trademark Office

N90-23517* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CATALYST FOR CARBON MONOXIDE OXIDATION Patent
BILLY T. UPCHURCH, inventor (to NASA), IRVIN M. MILLER, inventor (to NASA), DAVID R. BROWN, inventor (to NASA), PATRICIA DAVIS, inventor (to NASA), DAVID R. SCHRYER, inventor (to NASA), KENNETH G. BROWN, inventor (to NASA), and JOHN D. VANNORMAN, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) 27 Mar. 1990 5 p Filed 18 Jan. 1989 Supersedes N90-11823 (28 - 3, p 321)
(NASA-CASE-LAR-14155-1-SB; US-PATENT-4,912,082; US-PATENT-APPL-SN-298150; US-PATENT-CLASS-502-218; US-PATENT-CLASS-502-217; US-PATENT-CLASS-502-226; US-PATENT-CLASS-502-239; US-PATENT-CLASS-502-241; US-PATENT-CLASS-502-245; US-PATENT-CLASS-502-324) Avail: US Patent and Trademark Office CSCL 07D

A catalyst is disclosed for the combination of CO and O2 to form CO2, which includes a platinum group metal (e.g., platinum); a reducable metal oxide having multiple valence states (e.g., SnO2); and a compound which can bind water to its structure (e.g., silica gel). This catalyst is ideally suited for application to high-powered pulsed, CO2 lasers operating in a sealed or closed-cycle condition.

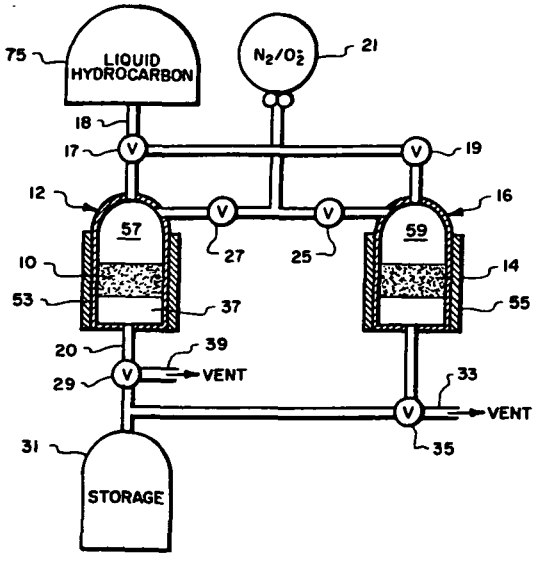
Official Gazette of the U.S. Patent and Trademark Office

N90-26098*# National Aeronautics and Space Administration. Pasadena Office, CA.
REGENERATIVE CU LA ZEOLITE SUPPORTED DESULFURIZING SORBENTS Patent Application
GERALD E. VOECKS, inventor (to NASA) and PRAMOD SHARMA, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 12 Apr. 1990 21 p
(Contract NAS7-918)
(NASA-CASE-NPO-17480-1-CU; NAS 1.71:NPO-17480-1-CU; US-PATENT-APPL-SN-508386) Avail: NTIS HC A03/MF A01 CSCL 07D

Efficient, regenerable sorbents for removal of H2S from fluid hydrocarbons such as diesel fuel at moderate condition comprise

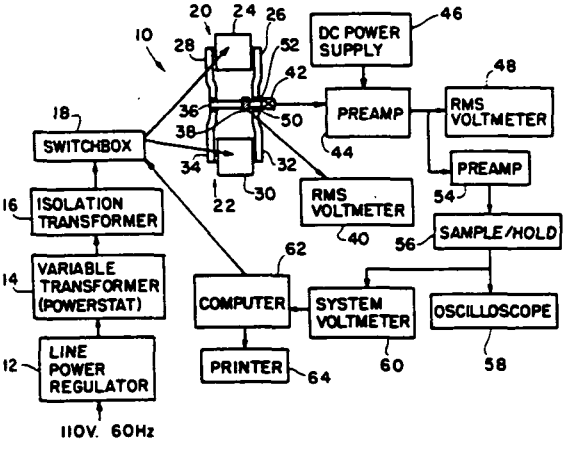
a porous, high surface area aluminosilicate support, suitably a synthetic zeolite, and most preferably a zeolite having a free lattice opening of at least 6 Angstroms containing from 0.1 to 0.5 moles of copper ions, lanthanum ions or their mixtures. The sorbent removes sulfur from the hydrocarbon fuel in high efficiency and can be repetitively regenerated without loss of activity.

NASA



the residual magnetic induction.

Official Gazette of the U.S. Patent and Trademark Office



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METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N90-21170* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

MAGNETO ACOUSTIC EMISSION APPARATUS FOR TESTING MATERIALS FOR EMBRITTLEMENT Patent

SIDNEY G. ALLISON, inventor (to NASA), NAMKUNG MIN, inventor (to NASA), WILLIAM T. YOST, inventor (to NASA), and JOHN H. CANTRELL, inventor (to NASA) 27 Mar. 1990 10 p Filed 23 Jun. 1988 Supersedes N88-29012 (26 - 23, p 3195) (NASA-CASE-LAR-13817-1; US-PATENT-4,912,411; US-PATENT-APPL-SN-210486; US-PATENT-CLASS-324-235; US-PATENT-CLASS-073-801; US-PATENT-CLASS-324-209; US-PATENT-CLASS-324-226; US-PATENT-CLASS-324-227; US-PATENT-CLASS-324-239) Avail: US Patent and Trademark Office CSCL 11F

A method and apparatus for testing steel components for temper embrittlement uses magneto-acoustic emission to nondestructively evaluate the component. Acoustic emission signals occur more frequently at higher levels in embrittled components. A pair of electromagnets are used to create magnetic induction in the test component. Magneto-acoustic emission signals may be generated by applying an ac current to the electromagnets. The acoustic emission signals are analyzed to provide a comparison between a component known to be unembrittled and a test component. Magnetic remanence is determined by applying a dc current to the electromagnets, then turning the magnets off and observing

N90-26940*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

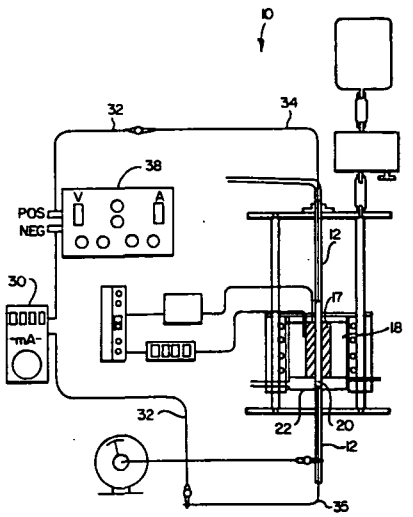
SOLIDIFICATION PROCESSING OF ALLOYS USING AN APPLIED ELECTRIC FIELD Patent Application

EUGENE C. MCKANNAN, inventor (to NASA), DEBORAH D. SCHMIDT, inventor (to NASA), SHAFFIQ AHMED, inventor (to NASA), and ROBERT W. BOND, inventor (to NASA) (Alabama Univ., Huntsville.) 31 May 1990 21 p (NASA-CASE-MFS-26083-1-CU; NAS 1.71:MFS-26083-1-CU; US-PATENT-APPL-SN-531375) Avail: NTIS HC A03/MF A01 CSCL 11F

A method is provided for obtaining an alloy having an ordered microstructure which comprises the steps of heating the central portion of the alloy under uniform temperature so that it enters a liquid phase while the outer portions remain solid, applying a constant electric current through the alloy during the heating step, and solidifying the liquid central portion of the alloy by subjecting it to a temperature-gradient zone so that cooling occurs in a directional manner and at a given rate of speed while maintaining the application of the constant electric current through the alloy. The method of the present invention produces an alloy having superior characteristics such as reduced segregation. After subsequent precipitation by heat-treatment, the alloys produced by the present invention will have excellent strength and

high-temperature resistance.

NASA



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NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N90-21177* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
BORON-CONTAINING ORGANOSILANE POLYMERS AND CERAMIC MATERIALS THEREOF Patent
SALVATORE R. RICCITIELLO, inventor (to NASA), MING-TA S. HSU, inventor (to NASA), and TIMOTHY S. CHEN, inventor (to NASA) (Information General Corp., Palo Alto, CA.) 25 Jul. 1989 10 p Filed 11 Aug. 1988 Continuation-in-part of US-Patent-4,767,728; US-Patent-Appl-SN-890577, dated 30 Jul. 1986
(NASA-CASE-ARC-11649-2-SB; US-PATENT-4,851,491; US-PATENT-APPL-SN-231027; US-PATENT-CLASS-528-4; US-PATENT-CLASS-528-10; US-PATENT-CLASS-528-30; US-PATENT-CLASS-556-402; US-PATENT-CLASS-501-88; US-PATENT-CLASS-501-91; US-PATENT-CLASS-501-92) Avail: US Patent and Trademark Office CSCL 11B

The present invention relates to a polyorgano borosilane ceramic precursor polymer comprising a plurality of repeating units of the formula: (R(sup 1) single bond B)(sub p) being linked together at B by second units of the formula: single bond (R sup 2) single bond (Si single bond R sup 3) single bond (sub q), where R(sup 1) is a lower alkyl, cycloalkyl, phenyl, or (R(sup 2)R(sup 3) single bond Si single bond B single bond)(sub n) and R(sup 2) and R(sup 3) are each independently selected from hydrogen, lower alkyl, vinyl, cycloalkyl, or aryl, n is an integer between 1 and 100; p is an integer between 1 and 100; and q is an integer between 1 and 100. These materials are prepared by combining an organo borohalide of the formula R(sup 4) single bond B single bond (X sup 1) (sub 2) where R(sup 4) is selected from halogen, lower alkyl, cycloalkyl, or aryl, and an organo halosilane of the formula: R(sup 2)(R sup 3)Si(X sup 2)(sub 2) where R(sup 2) and R (sup 3) are each independently selected from lower alkyl, cycloalkyl, or aryl, and X(sup 1) and X(sup 2) are each independently selected from halogen, in an anhydrous aprotic solvent having a boiling point at ambient pressure of not greater than 160 C with in excess of four equivalents of an alkali metal, heating the reaction mixture and recovering the polyorgano borosilane. These silicon boron polymers are useful to generate high-temperature ceramic materials, such as SiC, SiB4, and B4C, upon thermal degradation above 600 C.

Official Gazette of the U.S. Patent and Trademark Office

N90-21198* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PROCESS FOR CROSSLINKING METHYLENE-CONTAINING AROMATIC POLYMERS WITH IONIZING RADIATION Patent
VERNON L. BELL, inventor (to NASA) and STEPHEN J. HAVENS, inventor (to NASA) (Kentron International, Inc., Hampton, VA.) 20 Mar. 1990 11 p Filed 11 Mar. 1986 Supersedes N86-24840 (24 - 15, p 2439)
(NASA-CASE-LAR-13448-1; US-PATENT-4,910,233; US-PATENT-APPL-SN-838654; US-PATENT-CLASS-522-162; US-PATENT-CLASS-264-022; US-PATENT-CLASS-522-165; US-PATENT-CLASS-528-176; US-PATENT-CLASS-528-308)
Avail: US Patent and Trademark Office CSCL 11C

A process for crosslinking aromatic polymers containing radiation-sensitive methylene groups (-CH2-) by exposing the polymers to ionizing radiation thereby causing crosslinking of the polymers through the methylene groups is described. Crosslinked polymers are resistant to most organic solvents such as acetone, alcohols, hydrocarbons, methylene, chloride, chloroform, and other halogenated hydrocarbons, to common fuels and to hydraulic fluids in contrast to readily soluble uncrosslinked polymers. In addition, the degree of crosslinking of the polymers depends upon the percentage of the connecting groups which are methylene which ranges from 5 to 50 pct and preferably from 25 to 50 pct of the connecting groups, and is also controlled by the level of irradiation which ranges from 25 to 1000 Mrads and preferably from 25 to 250 Mrads. The temperature of the reaction conditions ranges from 25 to 200 C and preferably at or slightly above the glass transition temperature of the polymer. The crosslinked polymers are generally more resistant to degradation at elevated temperatures such as greater than 150 C, have a reduced tendency to creep under load, and show no significant embrittlement of parts fabricated from the polymers.

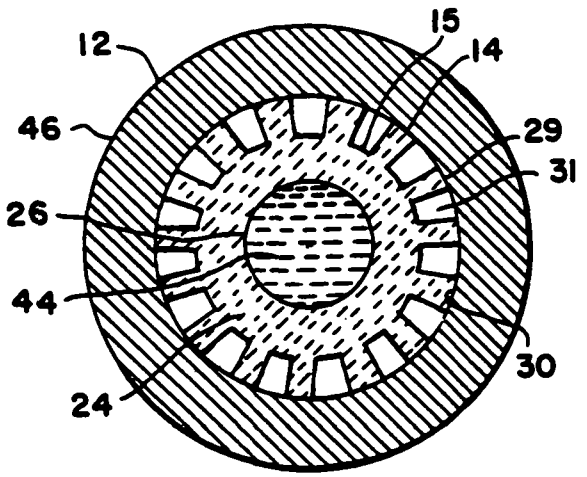
Official Gazette of the U.S. Patent and Trademark Office

N90-23541* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
CERAMIC HEAT PIPE WICK Patent
BENJAMIN SEIDENBERG, inventor (to NASA) and THEODORE SWANSON, inventor (to NASA) 28 Nov. 1989 7 p Filed 31 Jan. 1989 Supersedes N90-15261 (28 - 7, p 910)
(NASA-CASE-GSC-13199-1; US-PATENT-4,883,116; US-PATENT-APPL-SN-304147; US-PATENT-CLASS-165-104.26; US-PATENT-CLASS-165-905; US-PATENT-CLASS-165-41; US-PATENT-CLASS-122-366; INT-PATENT-CLASS-F28D-15/02)
Avail: US Patent and Trademark Office CSCL 11C

A wick for use in a capillary loop pump heat pipe is disclosed. The wick material is an essentially uniformly porous, permeable, open-cell, silicon dioxide/aluminum oxide inorganic ceramic foam having a silica fiber ratio, by weight, of about 78 to 22, respectively, a density of 6 lbs/cu ft, and an average pore size of less than 5 microns. A representative material having these characteristics is Lockheed Missile and Space Company, Inc.'s HTP 6-22. This material is fully compatible with the freons and anhydrous ammonia and allows for the use of these very efficient working fluids, and

others, in capillary loops.

Official Gazette of the U.S. Patent and Trademark Office



N90-23544* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

NONINTRUSIVE METHOD AND APPARATUS FOR MONITORING THE CURE OF POLYMERIC MATERIALS Patent

DAVID F. JOHNSTON, inventor (to NASA) and ROBERT L. FOX, inventor (to NASA) 2 Jan. 1990 8 p Filed 16 Feb. 1988 (NASA-CASE-LAR-13465-1; US-PATENT-4,891,591; US-PATENT-APPL-SN-133413; US-PATENT-CLASS-324-234; US-PATENT-CLASS-264-40.1; US-PATENT-CLASS-324-236; US-PATENT-CLASS-526-60; INT-PATENT-CLASS-G01N-27/72; INT-PATENT-CLASS-G01R-33/12; INT-PATENT-CLASS-G01R-27/00) Avail: US Patent and Trademark Office CSCL 11C

The invention is a nonintrusive method of monitoring the cure of a polymeric material using an electromagnetic field to sense a change of resistance of the polymeric material in the electromagnetic field that occurs during curing. This change of resistance is used to vary the impedance of an alternating voltage power supply that produces the electromagnetic field and which change of impedance is measured periodically or continuously to monitor the cure of said polymeric material. The apparatus for practicing the method of this invention may include a nonintrusive sensing head providing an inner, electromagnetic core within an open ended outer pot formed of magnet material. The open end of the pot core is positioned from a selected area of the surface of a sheet of the polymeric material. An alternating voltage supply circuit includes an inductance coil around the electromagnetic core and capacitor connected in parallel with the inductance coil forms a resonant tank circuit when energized. The resulting change in resistance of the polymeric material opposite the open end, a function of the curing, is measured as a corresponding change in the impedance of the power supply circuit to thereby monitor the cure of the polymeric material in the selected area.

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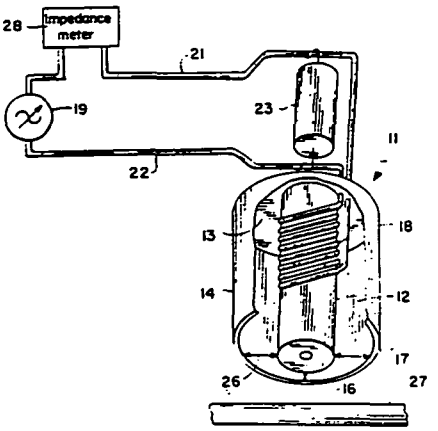


N90-23545* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ACETYLENE TERMINATED ASPARTIMIDES AND RESINS THEREFROM Patent

PAUL M. HERGENROTHER, inventor (to NASA), JOHN W. CONNELL, inventor (to NASA), and STEPHEN J. HAVENS, inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.) 26 Dec. 1989 20 p Filed 24 Mar. 1989 Continuation-in-part of abandoned US-Patent-Appl-SN-087375, filed 20 Aug. 1987 (NASA-CASE-LAR-14188-1; US-PATENT-4,889,912; US-PATENT-APPL-SN-328392; US-PATENT-APPL-SN-087375; US-PATENT-CLASS-528-125; US-PATENT-CLASS-548-520; US-PATENT-CLASS-528-126; US-PATENT-CLASS-528-128; US-PATENT-CLASS-528-171-175; US-PATENT-CLASS-528-212) Avail: US Patent and Trademark Office CSCL 11C

Acetylene terminated aspartimides are prepared using two methods. In the first, an amino-substituted aromatic acetylene is reacted with an aromatic bismaleimide in a solvent of glacial acetic acid and/or m-cresol. In the second method, an aromatic diamine is reacted with an ethynyl containing maleimide, such an N-(3-ethynyl phenyl) maleimide, in a solvent of glacial acetic acid and/or m-cresol. In addition, acetylene terminated aspartimides are blended with various acetylene terminated oligomers and polymers to yield composite materials exhibiting improved mechanical properties.

Official Gazette of the U.S. Patent and Trademark Office

N90-23546* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

PROCESS FOR LOWERING THE DIELECTRIC CONSTANT OF POLYIMIDES USING DIAMIC ACID ADDITIVES Patent

DIANE M. STOAKLEY, inventor (to NASA) and ANNE K. ST.CLAIR, inventor (to NASA) 23 Jan. 1990 8 p Filed 1 Sep. 1988 (NASA-CASE-LAR-13902-1; US-PATENT-4,895,972; US-PATENT-APPL-SN-239259; US-PATENT-CLASS-528-353; US-PATENT-CLASS-528-125; US-PATENT-CLASS-528-126; US-PATENT-CLASS-528-128; US-PATENT-CLASS-528-172; US-PATENT-CLASS-528-185; US-PATENT-CLASS-528-188) Avail: US Patent and Trademark Office CSCL 11C

Linear aromatic polyimides with low dielectric constants are produced by adding a diamic acid additive to the polyamic acid resin formed by the condensation of an aromatic dianhydride with an aromatic diamine. The resulting modified polyimide is a better electrical insulator than state-of-the-art commercially available polyimides.

Official Gazette of the U.S. Patent and Trademark Office

N90-23566* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
LIGHTWEIGHT CERAMIC INSULATION AND METHOD Patent
DAVID J. GREEN, inventor (to NASA) (Rockwell International Corp., Houston, TX.) 24 Apr. 1990 4 p Filed 30 Jun. 1988 Supersedes N89-13620 (27 - 5, p 618)
(NASA-CASE-MSC-20782-1; US-PATENT-4,919,852; US-PATENT-APPL-SN-213392; US-PATENT-CLASS-264-6; US-PATENT-CLASS-264-11; US-PATENT-CLASS-264-43; US-PATENT-CLASS-264-28; INT-PATENT-CLASS-B29B-33/02) Avail: US Patent and Trademark Office CSCL 11C

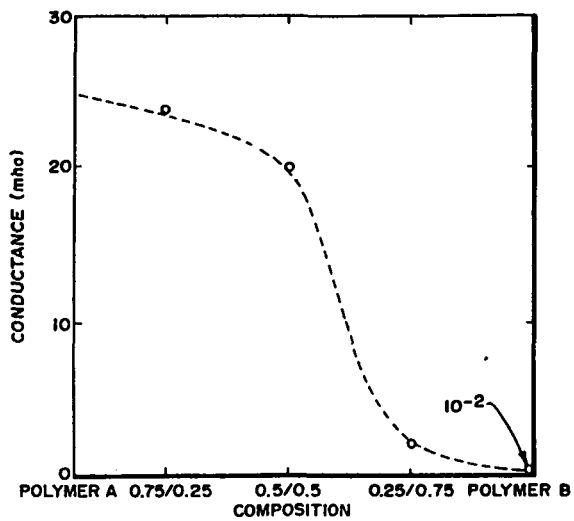
A process is disclosed for manufacturing a low density ceramic powder which can be formed to make a lightweight material for insulation or other construction. The ceramic product made from the process has a final density of less than 25 to about 1 percent of the theoretical weight of the ceramic powder. The ceramic product is lightweight and can be made to withstand high temperatures greater than 1400 C.

Official Gazette of the U.S. Patent and Trademark Office

N90-26952*# National Aeronautics and Space Administration. Pasadena Office, CA.
SILICON CONTAINING ELECTROCONDUCTIVE POLYMERS AND STRUCTURES MADE THEREFROM Patent Application
GANESAN NAGASUBRAMANIAN, inventor (to NASA), SALVADOR DISTEFANO, inventor (to NASA), and RANTY H. LIANG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 7 Feb. 1990 22 p
(Contract NAS7-918)
(NASA-CASE-NPO-17826-1-CU; NAS 1.71:NPO-17826-1-CU; US-PATENT-APPL-SN-479485) Avail: NTIS HC A03/MF A01 CSCL 11C

An electropolymerized film comprised of polymers and copolymers of a monomer is formed on the surface of an anode. The finished structures have superior electrical and mechanical properties for use in applications such as electrostatic dissipation and for the reduction of the radar cross section of advanced aircraft.

NASA



N90-26953*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
IMIDE/ARYLENE ETHER COPOLYMERS Patent Application
BRIAN J. JENSEN, inventor (to NASA), PAUL M. HERGENROTHER, inventor (to NASA), and ROBERT G. BASS, inventor (to NASA) (Virginia Commonwealth Univ., Richmond.) 21 Nov. 1989 21 p
(NASA-CASE-LAR-14159-1-CU; NAS 1.71:LAR-14159-1-CU; US-PATENT-APPL-SN-439317) Avail: NTIS HC A03/MF A01 CSCL 11C

Imide/arylene ether block copolymers are prepared by reacting anhydride terminated poly(amic acids) with amine terminated poly(arylene ethers) in polar aprotic solvents and chemically or thermally cyclodehydrating the resulting intermediate poly(amic acids). The resulting block copolymers have one glass transition temperature or two, depending upon the particular structure and/or the compatibility of the block units. Most of these block copolymers form tough, solvent resistant films with high tensile properties.

NASA

N90-26954*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
POLYIMIDAZOLES VIA AROMATIC NUCLEOPHILIC DISPLACEMENT Patent Application
JOHN W. CONNELL, inventor (to NASA) and PAUL M. HERGENROTHER, inventor (to NASA) 12 Apr. 1990 17 p
(NASA-CASE-LAR-14145-1; NAS 1.71:LAR-14145-1; US-PATENT-APPL-SN-508316) Avail: NTIS HC A03/MF A01 CSCL 11C

Polyimidazoles (PI) are prepared by the aromatic nucleophilic displacement reaction of di(hydroxyphenyl) imidazole monomers with activated aromatic dihalides or activated aromatic dinitro compounds. The reactions are carried out in polar aprotic solvents such as N,N-dimethyl acetamide, sulfolane, N-methylpyrrolidinone, dimethylsulfoxide, or diphenylsulfone using alkali metal bases such as potassium carbonate at elevated temperatures under nitrogen. The di(hydroxyphenyl) imidazole monomers are prepared by reacting an aromatic aldehyde with a dimethoxybenzil or by reacting an aromatic dialdehyde with a methoxybenzil in the presence of ammonium acetate. The di(methoxyphenyl) imidazole is subsequently treated with aqueous hydrobromic acid to give the di(hydroxphenyl) imidazole monomer. This synthetic route has provided high molecular weight PI of new chemical structure, is economically and synthetically more favorable than other routes, and allows for facile chemical structure variation due to the availability of a large variety of activated aromatic dihalides and dinitro compounds.

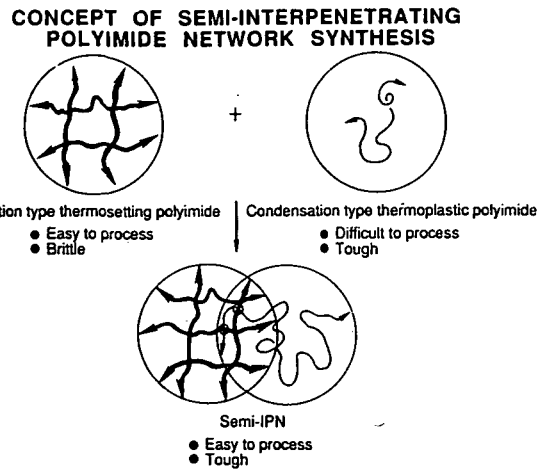
NASA

N90-26955*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A TOUGH PERFORMANCE SIMULTANEOUS SEMI-INTERPENETRATING POLYMER NETWORK Patent Application
RUTH H. PATER, inventor (to NASA) 2 Nov. 1989 31 p
(NASA-CASE-LAR-14339-1; NAS 1.71:LAR-14339-1; US-PATENT-APPL-SN-430470) Avail: NTIS HC A03/MF A01 CSCL 11C

A semi-interpenetrating polyimide (semi-IPN) network and methods for making and using the same are disclosed. The semi-IPN system comprises a high performance thermosetting polyimide having an acetylene-terminated group acting as a crosslinking site and a high performance linear thermoplastic polyimide. The polymer is made by combining low viscosity precursors and low molecular weight polymers of the thermosetting and thermoplastic polyimides and allowing them to react in the immediate presence of each other to form a simultaneous semi-interpenetrating polyimide network. Provided is a high temperature system having significantly improved processability and damage tolerance while maintaining excellent thermo-oxidative stability, mechanical properties and resistance to humidity, when compared with the commercial high temperature resin, Thermid 600. This material is particularly adapted for use as a molding,

adhesive and advanced composite matrix for aerospace structural and electronic applications.

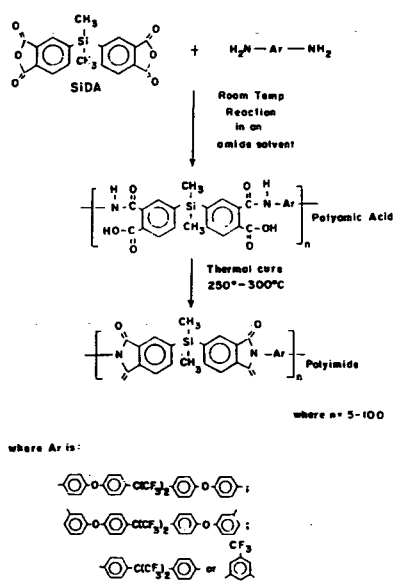
NASA



N90-26956*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
AROMATIC POLYIMIDES CONTAINING A DIMETHYLSILANE-LINKED DIANHYDRIDE Patent Application
ANNE K. ST.CLAIR, inventor (to NASA), TERRY L. ST.CLAIR, inventor (to NASA), and J. RICHARD PRATT, inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.) 12 Dec. 1989 12 p (NASA-CASE-LAR-14198-1; NAS 1.71:LAR-14198-1; US-PATENT-APPL-SN-449210) Avail: NTIS HC A03/MF A01 CSCL 11C

A high-temperature stable, optically transparent, low dielectric aromatic polyimide is prepared by chemically combining equimolar quantities of an aromatic dianhydride reactant and an aromatic diamine reactant, which are selected so that one reactant contains at least one Si(CH3)2 group in its molecular structure, and the other reactant contains at least one -CF3 group in its molecular structure. The reactants are chemically combined in a solvent medium to form a solution of a high molecular weight polyamic acid, which is then converted to the corresponding polyimide.

NASA



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MATERIALS PROCESSING

Includes space-based development of products and processes for commercial applications.

N90-20236* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, FL.
VORTEX MOTION PHASE SEPARATOR FOR ZERO GRAVITY LIQUID TRANSFER Patent
FRANK S. HOWARD, inventor (to NASA) and WILSON M. FRASER, JR., inventor (to NASA) 18 Jul. 1989 8 p Filed 16 Aug. 1988 (NASA-CASE-KSC-11387-1; US-PATENT-4,848,987; US-PATENT-APPL-SN-232734; US-PATENT-CLASS-55-160; US-PATENT-CLASS-55-182; US-PATENT-CLASS-55-205; US-PATENT-CLASS-141-45) Avail: US Patent and Trademark Office CSCL 22A

A vortex motion phase separator is disclosed for transferring a liquid in a zero gravity environment while at the same time separating the liquid from vapors found within either the sender or the receiving tanks. The separator comprises a rigid sender tank having a circular cross-section and rigid receiver tank having a circular cross-section. A plurality of ducts connects the sender tank and the receiver tank. Disposed within the ducts connecting the receiver tank and the sender tank is a pump and a plurality of valves. The pump is powered by an electric motor and is adapted to draw either the liquid or a mixture of the liquid and the vapor from the sender tank. Initially, the mixture drawn from the sender tank is directed through a portion of the ductwork and back into the sender tank at a tangent to the inside surface of the sender tank, thereby creating a swirling vortex of the mixture within the sender tank. As the pumping action increases, the speed of the swirling action within the sender tank increases creating an increase in the centrifugal force operating on the mixture. The effect of the centrifugal force is to cause the heavier liquid to migrate to the inside surface of the sender tank and to separate from the vapor. When this separation reaches a predetermined degree, control means is activated to direct the liquid conveyed by the pump directly into the receiver tank. At the same time, the vapor within the receiver tank is directed from the receiver tank back into the sender tank. This flow continues until substantially all of the liquid is transferred from the sender tank to the receiver tank.

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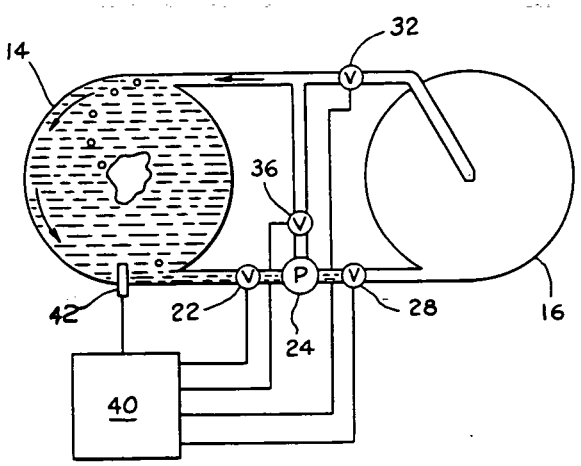

N90-21209* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
APPARATUS FOR MIXING SOLUTIONS IN LOW GRAVITY ENVIRONMENTS Patent
DANIEL C. CARTER, inventor (to NASA) and MARY B. BROOM, inventor (to NASA) (Universities Space Research Association, Huntsville, AL.) 20 Mar. 1990 8 p Filed 15 Sep. 1988
(NASA-CASE-MFS-26047-1; US-PATENT-4,909,933; US-PATENT-APPL-SN-244369; US-PATENT-CLASS-210-95; US-PATENT-CLASS-210-94; US-PATENT-CLASS-210-205; US-PATENT-CLASS-210-247; US-PATENT-CLASS-210-257.1; US-PATENT-CLASS-210-321.6; US-PATENT-CLASS-210-340)
Avail: US Patent and Trademark Office CSCL 12A

An apparatus is disclosed for allowing mixing of solutions in low gravity environments so as to carry out crystallization of proteins and other small molecules or other chemical syntheses, under conditions that maximize crystal growth and minimize disruptive turbulent effects. The apparatus is comprised of a housing, a plurality of chambers, and a cylindrical rotatable valve disposed between at least two of the chambers, said valve having an internal passageway so as to allow fluid movement between the chambers by rotation of the valve. In an alternate embodiment of the invention, a valve is provided having an additional internal passage way so that fluid from a third chamber can be mixed with the fluids of the first two chambers. This alternate embodiment of the invention is particularly desirable when it is necessary to provide a termination step to the crystal growth, or if a second synthetic step is required.

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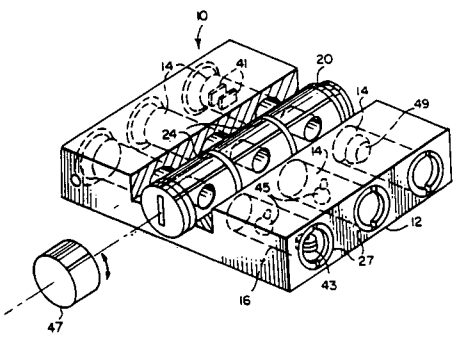

31

ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

N90-20254* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
SYSTEM FOR VENTING GAS FROM A LIQUID STORAGE TANK Patent
REGINA E. DUGAN, inventor (to NASA) 11 Jul. 1989 8 p Filed 30 Sep. 1988
(NASA-CASE-MSC-21253-1; US-PATENT-4,846,854; US-PATENT-APPL-SN-251439; US-PATENT-CLASS-55-46; US-PATENT-CLASS-55-159; US-PATENT-CLASS-137-154; US-PATENT-CLASS-141-93; US-PATENT-CLASS-239-543)
Avail: US Patent and Trademark Office CSCL 13B

Gas is vented from a non-cryogenic liquid storage tank while discharging pressurized liquid from a tube into the tank through a plurality of inclined jets, circumferentially spaced about an end of a vent tube positioned within the tube. Each jet is directed toward a central axis of the vent tube, such that the end of the vent tube receives gas from the vessel passing between individual jetstreams, which in combination form a conical shaped barrier to liquid droplets which would otherwise also pass to the vent tube and out the tank. Gas is thus vented through the central tube while pressurized liquid flows in an axially opposite direction in the annulus between the inner vent tube and the outer liquid tube. The system of the present invention is prarticularly well suited for venting gas from a tank being replenished with liquid at a zero or near zero gravity environment. A screen-type liquid acquisition device employing surface tension is provided for withdrawing substantially liquid from the tank. The withdrawn liquid may be resupplied to the liquid tube under pressure supplied by a circulating pump, thereby releasing substantially only gas from the storage tank to reduce the pressure in the tank.

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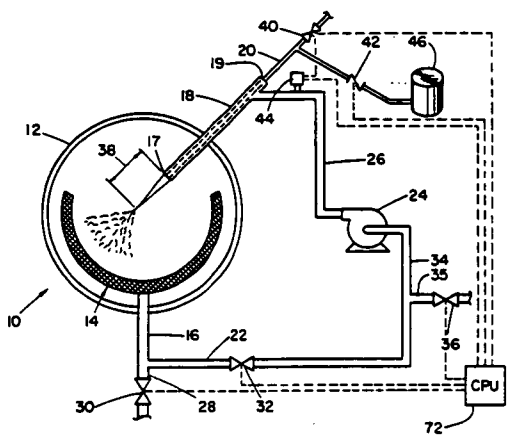

N90-21215* National Aeronautics and Space Administration. Pasadena Office, CA.
ACOUSTIC CONVECTIVE SYSTEM Patent
EUGENE H. TRINH, inventor (to NASA) and JUDITH L. ROBEY, inventor (to NASA) (California Inst. of Tech., Pasadena.) 22 Aug. 1989 6 p Filed 23 Mar. 1988
(Contract NAS7-918)
(NASA-CASE-NPO-17278-1-CU; US-PATENT-4,858,717; US-PATENT-APPL-SN-172100; US-PATENT-CLASS-181-0.5; US-PATENT-CLASS-361-383; US-PATENT-CLASS-361-384; US-PATENT-CLASS-361-385; US-PATENT-CLASS-62-467)
Avail: US Patent and Trademark Office CSCL 13B

A small and simple system is provided for cooling or heating a small component by flowing air or other fluid over it, which does not require any macroscopic moving parts. The system includes a transducer and reflector that are spaced apart with the component between them, and with the transducer being operated at a frequency resonant to the spacing between it and the reflector. The resulting standing wave pattern produces acoustic streaming which results in the circulating of air or other fluid in the environment across the component. The system is especially useful in the reduced gravity environment of outer space because of the absence

of any buoyancy-induced convection there.

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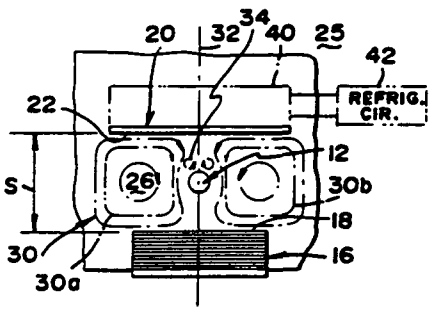

N90-21216* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

PRESSURE RIG FOR REPETITIVE CASTING Patent

PETER VASQUEZ, inventor (to NASA), WILLIAM R. HUTTO, inventor (to NASA), and ALBERT R. PHILIPS, inventor (to NASA) 12 Sep. 1989 6 p Filed 29 Aug. 1988 Continuation-in-part of US-Patent-Appl-SN-067846, filed 30 Jun. 1987, abandoned (NASA-CASE-LAR-14050-1; US-PATENT-4,865,114; US-PATENT-APPL-SN-237657; US-PATENT-CLASS-164-284; US-PATENT-CLASS-164-113; US-PATENT-CLASS-249-127; US-PATENT-APPL-SN-067846) Avail: US Patent and Trademark Office CSCL 13H

The invention is a pressure rig for repetitive casting of metal. The pressure rig performs like a piston for feeding molten metal into a mold. Pressure is applied to an expandable rubber diaphragm which expands like a balloon to force the metal into the mold. A ceramic cavity which holds molten metal is lined with blanket-type insulating material, necessitating only a relining for subsequent use and eliminating the lengthy cavity preparation inherent in previous rigs. In addition, the expandable rubber diaphragm is protected by the insulating material thereby decreasing its vulnerability to heat damage. As a result of the improved design the life expectancy of the pressure rig contemplated by the present invention is more than doubled. Moreover, the improved heat protection has allowed the casting of brass and other alloys with higher melting temperatures than possible in the conventional pressure rigs.

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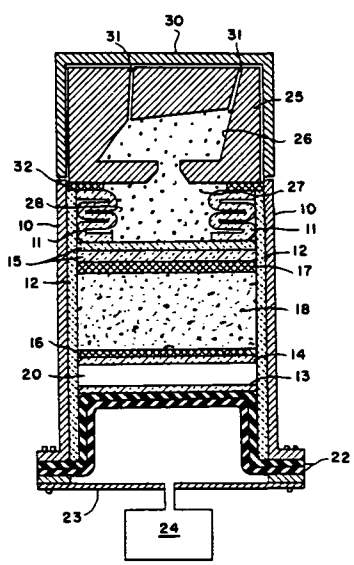

N90-23586* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

INTERNAL WIRE GUIDE FOR GTAW WELDING Patent

GENE E. MORGAN, inventor (to NASA) and GERALD E. DYER, inventor (to NASA) (Rockwell International Corp., Canoga Park, CA.) 7 Nov. 1989 5 p Filed 5 Dec. 1988 Supersedes N89-23739 (27 - 17, p 2420) Sponsored by NASA. Marshall Space Flight Center (NASA-CASE-MFS-29489-1; US-PATENT-4,879,446; US-PATENT-APPL-SN-279625; US-PATENT-CLASS-219-75; US-PATENT-CLASS-219-136; INT-PATENT-CLASS-B23K-9/16) Avail: US Patent and Trademark Office CSCL 13H

A welding torch for gas tungsten arc welding apparatus has a filler metal wire guide positioned within the torch, and within the shielding gas nozzle. The wire guide is adjacent to the tungsten electrode and has a ceramic liner through which the wire is fed. This reduces the size of the torch and eliminates the outside clearance problems that exit with external wire guides. Additionally, since the wire is always within the shielding gas, oxidizing of the wire is eliminated.

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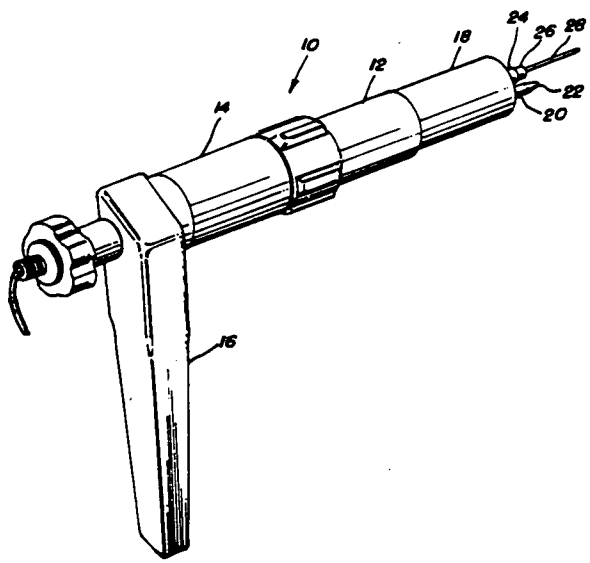

N90-23587* National Aeronautics and Space Administration. Pasadena Office, CA.

CONVERGENT STRAND ARRAY LIQUID PUMPING SYSTEM Patent

EARL R. COLLINS, JR., inventor (to NASA) 31 Oct. 1989 9 p Filed 13 Apr. 1989 (NASA-CASE-NPO-17301-1-CU; US-PATENT-4,877,082; US-PATENT-APPL-SN-337767; US-PATENT-CLASS-165-104.26; US-PATENT-CLASS-165-41; US-PATENT-CLASS-122-366; US-PATENT-CLASS-222-187; US-PATENT-CLASS-239-145; US-PATENT-CLASS-417-53; US-PATENT-CLASS-417-572) Avail: US Patent and Trademark Office CSCL 13H

A surface-tension liquid pumping system is provided by one or more arrays of converging solid monofilament fibers or metal wires (strands) spaced apart at an input end to gather liquid, and gathered close together at the opposite end where menisci forms between wetted strands to force liquid in the direction of convergence of the strands. The liquid pumping system is independent of gravity. It is illustrated as being used in a heat pump having a heating box to vaporize the liquid and a condensing chamber. Condensed liquid is returned by the pumping system to the heating box where it is again vaporized. A vapor tube carries the vapor to the condensing chamber. In that way, a closed system pumps heat from the heating box to the evaporating chamber and from there

radiated to the atmosphere.
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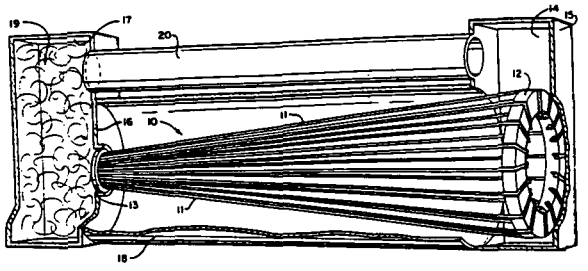

N90-26168* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
ELECTRODE CARRYING WIRE FOR GTAW WELDING Patent
GENE E. MORGAN, inventor (to NASA) and GERALD E. DYER, inventor (to NASA) 8 May 1990 5 p Filed 5 Dec. 1988 Supersedes N89-23738 (27 - 17, p 2420)
(NASA-CASE-MFS-29491-1; US-PATENT-4,924,053; US-PATENT-APPL-SN-279677; US-PATENT-CLASS-219-75; US-PATENT-CLASS-219-136; INT-PATENT-CLASS-B23K-9/24)
Avail: US Patent and Trademark Office CSCL 13H

A welding torch for gas tungsten arc welding apparatus has a hollow tungsten electrode including a ceramic liner and forms the filler metal wire guide. The wire is fed through the tungsten electrode thereby reducing the size of the torch to eliminate clearance problems which exist with external wire guides. Since the wire is preheated from the tungsten more wire may be fed into the weld puddle, and the wire will not oxidize because it is always within the shielding gas.
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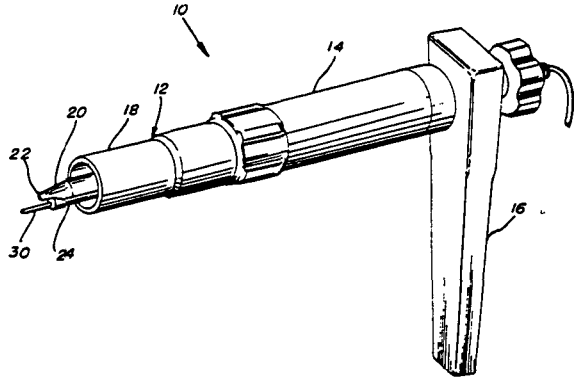
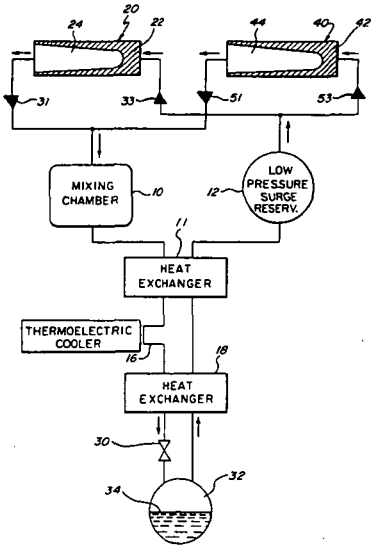


N90-26176*# National Aeronautics and Space Administration. Pasadena Office, CA.
MULTICOMPONENT GAS SORPTION JOULE-THOMSON REFRIGERATOR Patent Application
JACK JONES, inventor (to NASA), S. WALTER PETRICK, inventor (to NASA), and STEVEN BARD, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Jun. 1990 14 p (Contract NAS7-918)
(NASA-CASE-NPO-17569-1-CU; NAS 1.71:NPO-17569-1-CU; US-PATENT-APPL-SN-545236) Avail: NTIS HC A03/MF A01
CSCL 13B

The present invention relates to a cryogenic Joule-Thomson refrigeration capable of pumping multicomponent gases with a single stage sorption compressor system. Alternative methods of pumping a multicomponent gas with a single stage compressor are disclosed. In a first embodiment, the sorbent geometry is such that a void is defined near the output of the sorption compressor. When the sorbent is cooled, the sorbent primarily adsorbs the higher boiling point gas such that the lower boiling point gas passes through the sorbent to occupy the void. When the sorbent is heated, the higher boiling point gas is desorbed at high temperature and pressure and thereafter propels the lower boiling point gas out of the sorption compressor. A mixing chamber is provided to remix the constituent gases prior to expansion of the gas through a Joule-Thomson valve. Other methods of pumping a multicomponent gas are disclosed. For example, where the sorbent is porous and the low boiling point gas does not adsorb very well, the pores of the sorbent will act as a void space for the lower boiling point gas. Alternatively, a mixed sorbent may be used where a first sorbent component physically adsorbs the high boiling point gas and where the second sorbent component chemically absorbs the low boiling point gas.
NASA



32

COMMUNICATIONS AND RADAR

Includes radar; land and global communications; communications theory; and optical communications.

N90-20280* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
DOPPLER RADAR WITH MULTIPHASE MODULATION OF TRANSMITTED AND REFLECTED SIGNAL Patent
PAUL W. SHORES, inventor (to NASA), JOHN W. GRIFFIN, inventor (to NASA), and HERBERT S. KOBAYASHI, inventor (to NASA) 22 Aug. 1989 16 p Filed 25 Nov. 1987
(NASA-CASE-MSC-18808-1; US-PATENT-4,860,014; US-PATENT-APPL-SN-125677; US-PATENT-CLASS-342-105; US-PATENT-CLASS-342-114; US-PATENT-CLASS-342-195)
Avail: US Patent and Trademark Office CSCL 17I

A microwave radar signal is generated and split by a circulator. A phase shifter introduces a series of phase shifts into a first part of the split signal which is then transmitted by antenna. A like number of phase shifts is introduced by the phase shifter into the return signal from the target. The circulator delivers the phase

shifted return signal and the leakage signal from the circulator to a mixer which generates an IF signal output at the Doppler frequency. The IF signal is amplified, filtered, counted per unit of time, and the result displayed to provide indications of target sense and range rate. An oscillator controls rate of phase shift in the transmitted and received radar signals and provides a time base for the counter. The phase shift magnitude increases may be continuous and linear or discrete functions of time.

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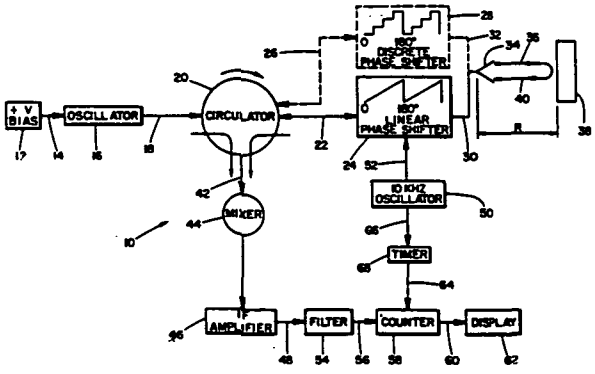


N90-27015*# National Aeronautics and Space Administration. Pasadena Office, CA.

PLANAR MICROSTRIP YAGI ARRAY ANTENNA Patent Application

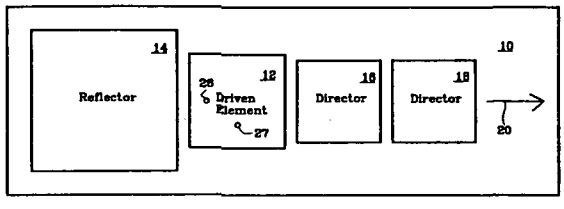
JOHN HUANG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 30 Mar. 1990 13 p

(Contract NAS7-918)

(NASA-CASE-NPO-17873-1-CU; NAS 1.71:NPO-17873-1-CU; US-PATENT-APPL-SN-501892) Avail: NTIS HC A03/MF A01 CSCL 20N

A planar microstrip antenna constructed in accordance with the principles of a Yagi antenna provides a single driven patch surrounded by an isolated reflector and one or more coplanar directors to provided endfire beam directivity without requiring power dividers or phase shifters.

NASA



N90-27016*# National Aeronautics and Space Administration. Pasadena Office, CA.

MULTISTAGE ESTIMATION OF RECEIVED CARRIER SIGNAL PARAMETERS UNDER VERY HIGH DYNAMIC CONDITIONS OF THE RECEIVER Patent Application

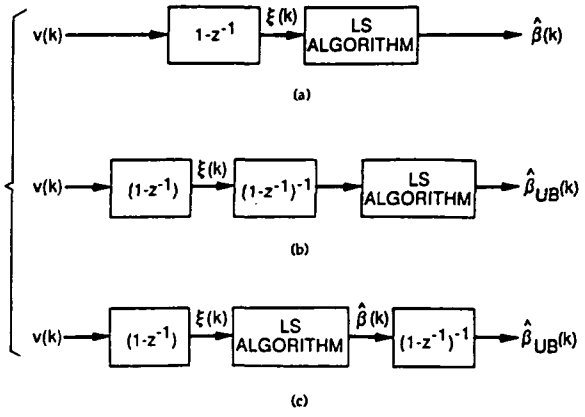
RAJENDRA KUMAR, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 14 May 1990 47 p

(Contract NAS7-918)

(NASA-CASE-NPO-17911-1-CU; NAS 1.71:NPO-17911-1-CU; US-PATENT-APPL-SN-517114) Avail: NTIS HC A03/MF A01 CSCL 17B

A multistage estimator is provided for the parameters of a received carrier signal possibly phase-modulated by unknown data and experiencing very high Doppler, Doppler rate, etc., as may arise, for example, in the case of Global Positioning Systems (GPS) where the signal parameters are directly related to the position, velocity and jerk of the GPS ground-based receiver. In a two-stage embodiment of the more general multistage scheme, the first stage, selected to be a modified least squares algorithm referred to as differential least squares (DLS), operates as a coarse estimator resulting in higher rms estimation errors but with a relatively small probability of the frequency estimation error exceeding one-half of the sampling frequency, provides relatively coarse estimates of the frequency and its derivatives. The second stage of the estimator, an extended Kalman filter (EKF), operates on the error signal available from the first stage refining the overall estimates of the phase along with a more refined estimate of frequency as well and in the process also reduces the number of cycle slips.

NASA



33

ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

N90-20282* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

MICROWAVE FIELD EFFECT TRANSISTOR Patent

HO-CHUNG HUANG, inventor (to NASA) (Radio Corp. of America, Bethesda, MD.) 27 Jun. 1989 12 p Filed 29 Nov. 1984 Continuation of US-Patent-Appl-SN-327659, dated 4 Dec. 1981, abandoned

(NASA-CASE-GSC-12442-2; US-PATENT-4,843,440; US-PATENT-APPL-SN-675471; US-PATENT-CLASS-357-22; US-PATENT-CLASS-357-68; US-PATENT-CLASS-357-76; US-PATENT-CLASS-357-81; US-PATENT-CLASS-357-55) Avail: US Patent and Trademark Office CSCL 09A

Electrodes of a high power, microwave field effect transistor are substantially matched to external input and output networks. The field effect transistor includes a metal ground plane layer, a dielectric layer on the ground plane layer, a gallium arsenide active region on the dielectric layer, and substantially coplanar spaced source, gate, and drain electrodes having active segments covering the active region. The active segment of the gate electrode is located between edges of the active segments of the source and drain electrodes. The gate and drain electrodes include inactive pads remote from the active segments. The pads are connected directly to the input and output networks. The source electrode is connected to the ground plane layer. The space between the electrodes and the geometry of the electrodes extablish parasitic shunt capacitances and series inductances that provide substantial

matches between the input network and the gate electrode and between the output network and the drain electrode. Many of the devices are connected in parallel and share a common active region, so that each pair of adjacent devices shares the same source electrodes and each pair of adjacent devices shares the same drain electrodes. The gate electrodes for the parallel devices are formed by a continuous stripe that extends between adjacent devices and is connected at different points to the common gate pad.

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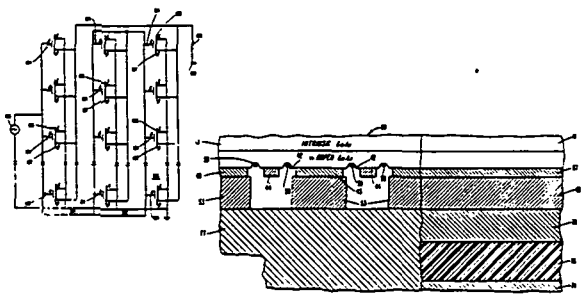

N90-20320* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ELECTRONIC PRECIPITATOR CONTROL Patent

DAVID F. JOHNSTON, inventor (to NASA) 22 Aug. 1989 8 p Filed 14 May 1986 Division of US Patent-4,605,424, US-Patent-Appl-SN-625436, filed 28 Jun. 1984 (NASA-CASE-LAR-13273-2; US-PATENT-4,860,149; US-PATENT-APPL-SN-862942; US-PATENT-CLASS-361-79; US-PATENT-CLASS-361-65; US-PATENT-CLASS-323-903; US-PATENT-CLASS-55-105; US-PATENT-CLASS-55-139; US-PATENT-APPL-SN-625436; US-PATENT-4,605,424) Avail: US Patent and Trademark Office CSCL 09A

A method and apparatus for controlling power to a precipitator are disclosed. After each spark the power to the precipitator is reduced to zero, increased along a fast ramp for a fixed period of time and then increased along a slow ramp until a spark occurs. The fast and slow ramp data is computed and stored (memory) and then retrieved after each spark. The data retrieved is the data corresponding to the firing angle at the last spark. Apparatus is provided (selector and memory) for dividing (frequency divider) the retrieved slow ramp data by a number to select the number of sparks per minute. Also the ac current and the ac voltage in the power to the precipitator are detected and if the difference is above a predetermined value the power is disconnected.

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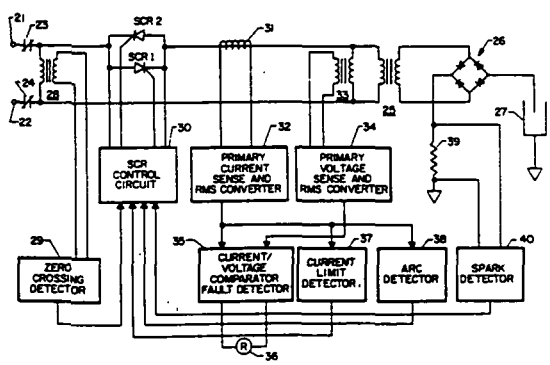

N90-21951* National Aeronautics and Space Administration. Pasadena Office, CA.

BALANCED BRIDGE FEEDBACK CONTROL SYSTEM Patent

BORIS J. LURIE, inventor (to NASA) (California Inst. of Tech., Pasadena.) 27 Mar. 1990 14 p Filed 21 Mar. 1989 (NASA-CASE-NPO-17430-1-CU; US-PATENT-4,912,386; US-PATENT-APPL-SN-332677; US-PATENT-CLASS-318-615; US-PATENT-CLASS-318-434; US-PATENT-CLASS-318-561; US-PATENT-CLASS-318-618; US-PATENT-CLASS-388-821) Avail: US Patent and Trademark Office CSCL 09A

In a system having a driver, a motor, and a mechanical plant, a multiloop feedback control apparatus for controlling the movement and/or positioning of a mechanical plant, the control apparatus has a first local bridge feedback loop for feeding back a signal representative of a selected ratio of voltage and current at the output driver, and a second bridge feedback loop for feeding back a signal representative of a selected ratio of force and velocity at the output of the motor. The control apparatus may further include an outer loop for feeding back a signal representing the angular velocity and/or position of the mechanical plant.

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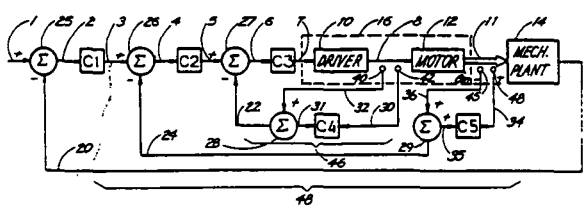


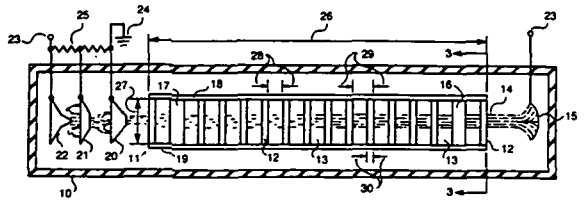
N90-22724* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

MINIATURE TRAVELING WAVE TUBE AND METHOD OF MAKING Patent

HENRY G. KOSMAHL 26 Dec. 1989 8 p Filed 8 Dec. 1987 Supersedes N88-23936 (26 - 17, p 2335) (Contract NAS3-24565) (NASA-CASE-LEW-14520-1; US-PATENT-APPL-SN-130058; US-PATENT-CLASS-315-3.5; US-PATENT-CLASS-315-3; US-PATENT-CLASS-331-82; INT-PATENT-CLASS-H01J-25/34; US-Patent-4,890,036) Avail: US Patent and Trademark Office CSCL 09A

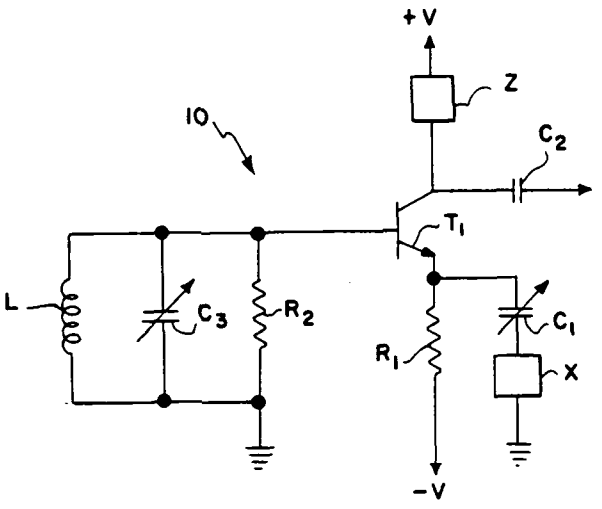
A miniature traveling wave tube is provided which will have most of the advantages of solid state circuitry but with higher efficiency and without being highly sensitive to temperature and various types of electromagnetic radiation and subatomic particles as are solid state devices. The traveling wave tube is about 2.5 cm in length and includes a slow wave circuit (SWS) comprised of apertured fins with a top cover which is insulated from the fins by strips or rungs of electrically insulating, dielectric material. An extemely small SWS is constructed by employing various grooving and etching methods, and by providing insulating strips or rungs

by various deposition and masking techniques.
Official Gazette of the U.S. Patent and Trademark Office



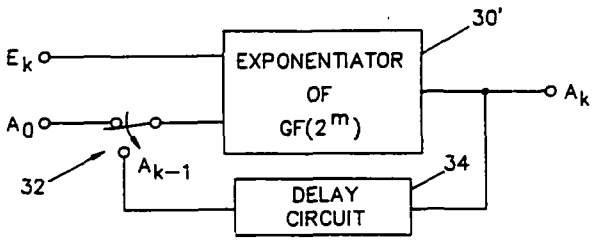
N90-23635* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
REFLECTION OSCILLATORS EMPLOYING SERIES RESONANT CRYSTALS' Patent
LEONARD L. KLEINBERG, inventor (to NASA) 10 Oct. 1989 7 p Filed 30 Dec. 1988
(NASA-CASE-GSC-13173-1; US-PATENT-4,873,498; US-PATENT-APPL-SN-292037; US-PATENT-CLASS-331-116FE; US-PATENT-CLASS-331-117FE; INT-PATENT-CLASS-H03B-5/12)
Avail: US Patent and Trademark Office CSCL 09A

A reflection oscillator is provided which employs an active device operated in its roll-off region and two resonant circuits. For an oscillator employing a bipolar transistor, the emitter is connected to a series resonant capacitor-crystal network and the base is connected to an L-C tank circuit with the transistor being operated in the roll-off region of its gain versus frequency curve. This will provide a very high frequency of operation with a relatively inexpensive, low frequency, active device. These oscillators are easily tuned, stable, and require little dc power.
Official Gazette of the U.S. Patent and Trademark Office



N90-23636* National Aeronautics and Space Administration. Pasadena Office, CA.
LONG PERIOD PSEUDO RANDOM NUMBER SEQUENCE GENERATOR Patent
CHARLES C. WANG, inventor (to NASA) 26 Dec. 1989 11 p Filed 29 Oct. 1987
(NASA-CASE-NPO-17241-1-CU; US-PATENT-4,890,252; US-PATENT-APPL-SN-113954; US-PATENT-CLASS-364-717; US-PATENT-CLASS-364-746.1; INT-PATENT-CLASS-G06F-1/02)
Avail: US Patent and Trademark Office CSCL 09A

A circuit for generating a sequence of pseudo random numbers, (A sub K). There is an exponentiator in GF(2 sup m) for the normal basis representation of elements in a finite field GF(2 sup m) each represented by m binary digits and having two inputs and an output from which the sequence (A sub K). Of pseudo random numbers is taken. One of the two inputs is connected to receive the outputs (E sub K) of maximal length shift register of n stages. There is a switch having a pair of inputs and an output. The switch outputs is connected to the other of the two inputs of the exponentiator. One of the switch inputs is connected for initially receiving a primitive element (A sub O) in GF(2 sup m). Finally, there is a delay circuit having an input and an output. The delay circuit output is connected to the other of the switch inputs and the delay circuit input is connected to the output of the exponentiator. Whereby after the exponentiator initially receives the primitive element (A sub O) in GF(2 sup m) through the switch, the switch can be switched to cause the exponentiator to receive as its input a delayed output A(K-1) from the exponentiator thereby generating (A sub K) continuously at the output of the exponentiator. The exponentiator in GF(2 sup m) is novel and comprises a cyclic-shift circuit; a Massey-Omura multiplier; and, a control logic circuit all operably connected together to perform the function U(sub i) = 92(sup i) (for n(sub i) = 1 or 1 (for n(subi) = 0).
Official Gazette of the U.S. Patent and Trademark Office

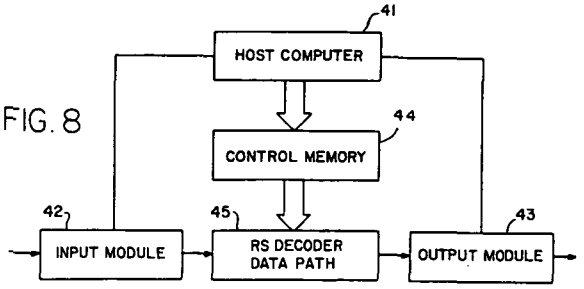


N90-27040*# National Aeronautics and Space Administration. Pasadena Office, CA.
VLSI ARCHITECTURE FOR A REED-SOLOMON DECODER Patent Application
IN-SHEK HSU, inventor (to NASA) and TRIEU-KIE TRUONG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 15 Feb. 1990 22 p
(Contract NAS7-918)
(NASA-CASE-NPO-17897-1-CU; NAS 1.71:NPO-17897-1-CU; US-PATENT-APPL-SN-480449) Avail: NTIS HC A03/MF A01 CSCL 09A

A basic single-chip building block for a Reed-Solomon (RS) decoder system is partitioned into a plurality of sections the first of which consists of a plurality of syndrome subcells each of which contains identical standard-basis finite-field multipliers that are programmable between 10 and 8 bit operation. A desired number of basic building blocks may be assembled to provide a

RS decoder of any syndrome subcell size that is programmable between 10 and 8 bit operation.

NASA



N90-27041*# National Aeronautics and Space Administration. Pasadena Office, CA.

METAL CHLORIDE CATHODE FOR A BATTERY Patent Application

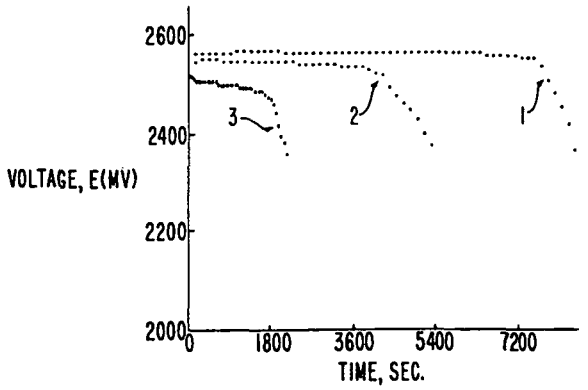
RATNAKUMAR V. BUGGA, inventor (to NASA), SALVADOR DISTEFANO, inventor (to NASA), and C. BERRY BANKSTON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 30 Mar. 1990 10 p

(Contract NAS7-918)

(NASA-CASE-NPO-17809-1-CU; NAS 1.71:NPO-17809-1-CU; US-PATENT-APPL-503409) Avail: NTIS HC A02/MF A01 CSCL 10C

A method of fabricating a rechargeable battery is disclosed which includes a positive electrode which contains a chloride of a selected metal when the electrode is in its active state. The improvement comprises fabricating the positive electrode by: providing a porous matrix composed of a metal; providing a solution of the chloride of the selected metal; and impregnating the matrix with the chloride from the solution.

NASA



N90-27042*# National Aeronautics and Space Administration. Pasadena Office, CA.

IMPROVED HIGH POWER/HIGH FREQUENCY INDUCTOR Patent Application

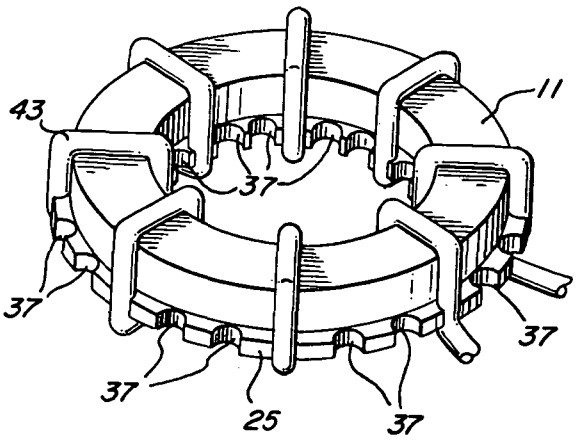
W. T. MCLYMAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 30 Nov. 1989 11 p

(Contract NAS7-918)

(NASA-CASE-NPO-17830-1-CU; NAS 1.71:NPO-17830-1-CU; US-PATENT-APPL-SN-443297) Avail: NTIS HC A03/MF A01 CSCL 09A

A toroidal core is mounted on an alignment disc having uniformly distributed circumferential notches or holes therein. Wire is then wound about the toroidal core in a uniform pattern defined by the notches or holes. Prior to winding, the wire may be placed within shrink tubing. The shrink tubing is then wound about the alignment disc and core and then heat-shrunk to positively retain the wire in the uniform position on the toroidal core.

NASA



34

FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

N90-20323* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

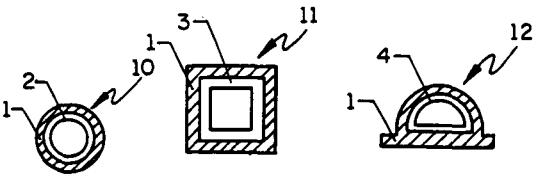
REUSABLE HIGH-TEMPERATURE HEAT PIPES AND HEAT PIPE PANELS Patent

CHARLES J. CAMARDA, inventor (to NASA) and PHILIP O. RANSONE, inventor (to NASA) 13 Jun. 1989 7 p Filed 29 Aug. 1988

(NASA-CASE-LAR-13761-1; US-PATENT-4,838,346; US-PATENT-APPL-SN-237036; US-PATENT-CLASS-165-104; US-PATENT-CLASS-165-41; US-PATENT-CLASS-165-133; US-PATENT-CLASS-165-180; US-PATENT-CLASS-165-905) Avail: US Patent and Trademark Office CSCL 20D

A reusable, durable heat pipe which is capable of operating at temperatures up to about 3000 F in an oxidizing environment and at temperatures above 3000 F in an inert or vacuum environment is produced by embedding a refractory metal pipe within a carbon-carbon composite structure. A reusable, durable heat pipe panel is made from an array of refractory-metal pipes spaced from each other. The reusable, durable, heat-pipe is employed to fabricate a hypersonic vehicle leading edge and nose cap.

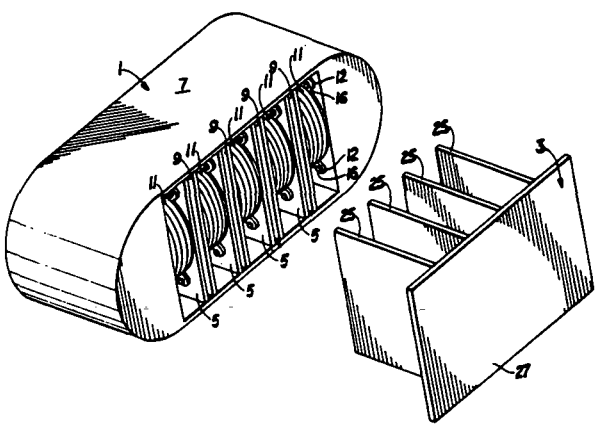
Official Gazette of the U.S. Patent and Trademark Office



N90-21999* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
PRESSURIZED BELLOWS FLAT CONTACT HEAT EXCHANGER INTERFACE Patent
FRED E. VOSS, inventor (to NASA), HAROLD R. HOWELL, inventor (to NASA), and ROGER V. WINKLER, inventor (to NASA) (LTV Aerospace and Defense Co., Dallas, TX.) 20 Mar. 1990 7 p Filed 30 Sep. 1988
(NASA-CASE-MSC-21271-1; US-PATENT-4,909,313; US-PATENT-APPL-SN-252077; US-PATENT-CLASS-165-78; US-PATENT-CLASS-165-96; US-PATENT-CLASS-165-46; US-PATENT-CLASS-165-32) Avail: US Patent and Trademark Office CSCL 20D

Disclosed is an interdigitated plate-type heat exchanger interface. The interface includes a modular interconnect to thermally connect a pair or pairs of plate-type heat exchangers to a second single or multiple plate-type heat exchanger. The modular interconnect comprises a series of parallel, plate-type heat exchangers arranged in pairs to form a slot therebetween. The plate-type heat exchangers of the second heat exchanger insert into the slots of the modular interconnect. Bellows are provided between the pairs of fins of the modular interconnect so that when the bellows are pressurized, they drive the plate-type heat exchangers of the modular interconnect toward one another, thus closing upon the second heat exchanger plates. Each end of the bellows has a part thereof a thin, membrane diaphragm which readily conforms to the contours of the heat exchanger plates of the modular interconnect when the bellows is pressurized. This ensures an even distribution of pressure on the heat exchangers of the modular interconnect thus creating substantially planar contact between the two heat exchangers. The effect of the interface of the present invention is to provide a dry connection between two heat exchangers whereby the rate of heat transfer can be varied by varying the pressure within the bellows.

Official Gazette of the U.S. Patent and Trademark Office



N90-23700* National Aeronautics and Space Administration. Pasadena Office, CA.
MULTI-ELEMENT SPHERICAL SHELL GENERATION Patent
ANDREW D. MORRISON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 20 Feb. 1990 7 p Filed 28 Sep. 1988 Supersedes N89-13728 (27 - 5, p 636)
(Contract NAS7-918)
(NASA-CASE-NPO-17203-1-CU; US-PATENT-4,902,450; US-PATENT-APPL-SN-250195; US-PATENT-CLASS-264-4; US-PATENT-CLASS-425-5; US-PATENT-CLASS-425-6; US-PATENT-CLASS-425-804; INT-PATENT-CLASS-B29B-9/10) Avail: US Patent and Trademark Office CSCL 20D

A nozzle assembly in a multi-element spherical shell generation system includes first and second side-by-side spaced apart nozzles and a web portion extending between and connecting the nozzles. The first nozzle has an inner orifice adapted to discharge a first filler material and an outer annular orifice separated from and defined in concentric relation about the inner orifice and adapted to discharge a first shell material. The second nozzle has an inner orifice adapted to discharge a second filler material and an outer annular orifice separated from and defined in concentric relation about the inner orifice and adapted to discharge a second shell material. A multi-element spherical shell can be formed through employment of the nozzle assembly by merger with one another after discharge from the outer orifices of the nozzles of a pair of adjacent annular streams of liquid or molten shell wall material of different compositions and encapsulation by the mixed shell wall materials of a common encapsulated core fluids also simultaneously discharged by the inner orifices nozzles. On the other hand, the pair of encapsulating streams of shell wall material can be of the same materials which merge together and encapsulate core fluids of different compositions which will merge together after discharge from the nozzles.

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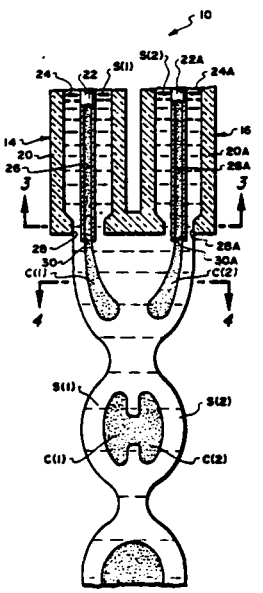
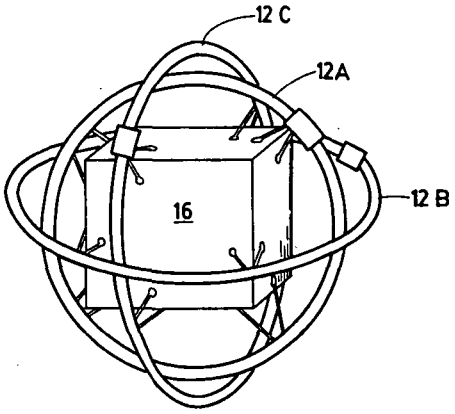


N90-26292*# National Aeronautics and Space Administration. Pasadena Office, CA.
FLUID-LOOP REACTION SYSTEM Patent Application
T. C. ISKENDERIAN, inventor (to NASA), B. J. LURIE, inventor (to NASA), and J. A. SCHIER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 31 Jan. 1990 26 p
(Contract NAS7-918)
(NASA-CASE-NPO-17204-1-CU; NAS 1.71:NPO-17204-1-CU; US-PATENT-APPL-SN-473242) Avail: NTIS HC A03/MF A01 CSCL 20D

An improved fluid actuating system for imparting motion to a body such as a spacecraft is disclosed. The fluid actuating system consists of a fluid mass that may be controllably accelerated through at least one fluid path whereby an opposite acceleration is experienced by the spacecraft. For full control of the spacecraft's orientation, the system would include a plurality of fluid paths. The fluid paths may be circular or irregular, and the fluid paths

may be located on the interior or exterior of the spacecraft.

NASA



N90-27070*# National Aeronautics and Space Administration. Pasadena Office, CA.

ADJUSTABLE CHOKE FOR FLUIDS NOZZLE Patent Application

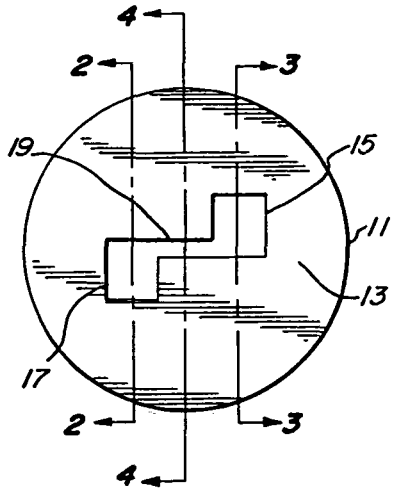
ANDREW D. MORRISON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 31 May 1990 14 p

(Contract NAS7-918)

(NASA-CASE-NPO-17625-1-CU; NAS 1.71:NPO-17625-1-CU; US-PATENT-APPL-SN-531434) Avail: NTIS HC A03/MF A01 CSCL 20D

A self-adjusting choke for fluids nozzle includes a membrane constructed of a single piece of flexible or elastic material. This flexible material is shaped to fit into the outlet of a nozzle. The body of the membrane has at least two flow channels, from one face to the other, which directs two streams of water to cross at the opening of the nozzle or at some point beyond. The elasticity and thickness of the membrane is selected to match the range of expected pressures and fluid velocities. The choke may have more than two flow channels, as long as they are aligned adjacent to one another and directed towards each other at the exit face. In a three orifice embodiment, one is directed upward, one is directed downward, and the one in the middle is directed forward. In this embodiment all three fluid streams intersect at some point past the nozzle opening. Under increased pressure the membrane will deform causing the orifices to realign in a more forward direction, causing the streams to intersect at a smaller angle. This reduces the force with which the separate streams impact each other, still allowing the separate streams to unify into a single stable spiralling stream in spite of the increased pressure.

NASA



N90-27071*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

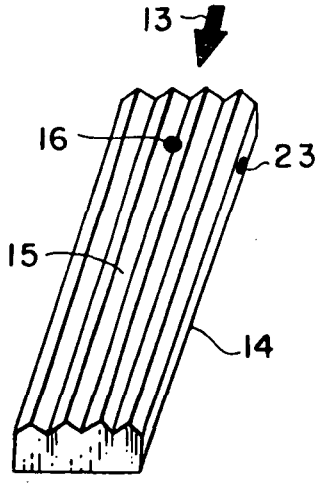
HYDRODYNAMIC SKIN-FRICTION REDUCTION Patent Application

JASON C. REED, inventor (to NASA) (Old Dominion Univ., Hampton, VA.), DENNIS M. BUSHNELL, inventor (to NASA), and LEONARD M. WEINSTEIN, inventor (to NASA) 31 Oct. 1989 18 p

(NASA-CASE-LAR-14078-1-CU; NAS 1.71:LAR-14078-1-CU; US-PATENT-APPL-SN-429737) Avail: NTIS HC A03/MF A01 CSCL 20D

A process for reducing skin friction, inhibiting the effects of liquid turbulence, and decreasing heat transfer in a system involving flow of a liquid along a surface of a body includes applying a substantially integral sheet of a gas, e.g., air, immediately adjacent to the surface of the body; a marine vehicle, which has a longitudinally grooved surface in proximity with the liquid and with a surface material having high contact angle between the liquid and said wall to reduce interaction of the liquid; water, with the surface of the body; and the hull of the marine vehicle.

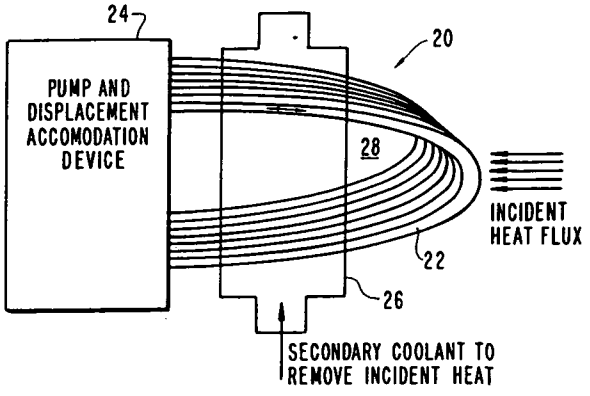
NASA



N90-27072*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
HEAT EXCHANGER WITH OSCILLATING FLOW Patent Application
STEPHEN J. SCOTTI, inventor (to NASA), MAX L. BLOSSER, inventor (to NASA), and CHARLES J. CAMARDA, inventor (to NASA) 30 Mar. 1990 21 p
(NASA-CASE-LAR-14033-1; NAS 1.71:LAR-14033-1; US-PATENT-APPL-SN-501909) Avail: NTIS HC A03/MF A01 CSCL 20D

Various heat exchange apparatuses are described in which an oscillating flow of primary coolant is used to dissipate an incident heat flux. The oscillating flow may be imparted by a reciprocating piston, a double action twin reciprocating piston, fluidic oscillators or electromagnetic pumps. The oscillating fluid flows through at least one conduit in either an open loop or a closed loop. A secondary flow of coolant may be used to flow over the outer walls of at least one conduit to remove heat transferred from the primary coolant to the walls of the conduit.

NASA



35

INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

N90-20351* National Aeronautics and Space Administration. Pasadena Office, CA.
DUAL CATHODE SYSTEM FOR ELECTRON BEAM INSTRUMENTS Patent
JAMES G. BRADLEY, inventor (to NASA), JOSEPH M. CONLEY, inventor (to NASA), and DAVID B. WITTRY, inventor (to NASA) (California Inst. of Tech., Pasadena.) 11 Jul. 1989 9 p Filed 11 Aug. 1987
(NASA-CASE-NPO-16878-1-CU; US-PATENT-4,847,502; US-PATENT-APPL-SN-084062; US-PATENT-CLASS-250-396-ML; US-PATENT-CLASS-250-396-R; US-PATENT-CLASS-250-310; US-PATENT-CLASS-219-121.28) Avail: US Patent and Trademark Office CSCL 14B

An electron beam source having a single electron optical axis is provided with two coplanar cathodes equally spaced on opposite sides from the electron optical axis. A switch permits selecting either cathode, and a deflection system comprised of electromagnets, each with separate pole pieces equally spaced from the plane of the cathodes and electron optical axis, first deflects the electron beam from a selected cathode toward the electron optical axis, and then in an opposite direction into convergence with the electron optical axis. The result is that the electron beam from one selected cathode undergoes a sigmoid deflection in two opposite directions, like the letter S, with the sigmoid deflection of each being a mirror image of the other.

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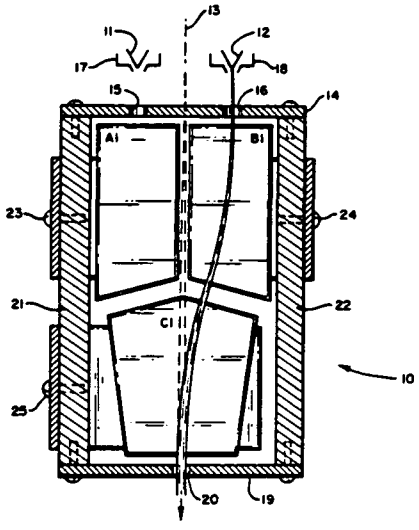

N90-21358* National Aeronautics and Space Administration. Pasadena Office, CA.
ALTERNATING GRADIENT PHOTODETECTOR Patent
ALBERT W. OVERHAUSER, inventor (to NASA) and JOSEPH MASERJIAN, inventor (to NASA) (California Inst. of Tech., Pasadena.) 22 Aug. 1989 9 p Filed 5 Nov. 1987
(NASA-CASE-NPO-17235-1-CU; US-PATENT-4,860,074; US-PATENT-APPL-SN-116811; US-PATENT-CLASS-357-30; US-PATENT-CLASS-357-58; US-PATENT-CLASS-357-90; US-PATENT-CLASS-357-4; US-PATENT-CLASS-357-29) Avail: US Patent and Trademark Office CSCL 14B

A far infrared (FIR) range responsive photodetector is disclosed. There is a substrate of degenerate germanium. A plurality of alternating impurity-band and high resistivity layers of germanium are disposed on the substrate. The impurity-band layers have a doping concentration therein sufficiently high to include donor bands which can release electrons upon impingement by FIR photons of energy hv greater than an energy gap epsilon. The high resistivity layers have a doping concentration therein sufficiently low as to not include conducting donor bands and are depleted of electrons. Metal contacts are provided for applying an electrical field across the substrate and the plurality of layers. In the preferred embodiment as shown, the substrate is degenerate n-type (N+ +) germanium; the impurity-band layers are n+ layers of germanium doped to approximately the low 10(exp 16)/cu cm range; and, the high resistivity layers are n-layers of germanium doped to a maximum of approximately 10(exp)/cu cm. Additionally, the impurity-band layers have a thickness less than a conduction-electron diffusion length in germanium and likely to be in the range of 0.1 to 1.0 micron, the plurality of impurity-bands is of a number such that the flux of FIR photons passing therethrough will be substantially totally absorbed therein, the thickness of the high resistivity layers is such compared to the voltage applied that the voltage drop in each the high resistivity layers controls

the occurence of impact ionization in the impurity-band layers to a desired level.

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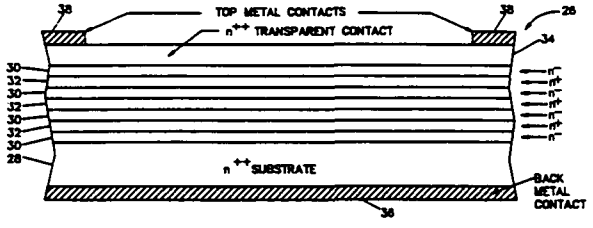

N90-22023* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, FL.

INDUCTION-TYPE METAL DETECTOR WITH INCREASED SCANNING AREA CAPABILITY Patent

EDWARD S. LESKY, inventor (to NASA), ALAN J. REID, inventor (to NASA), WILTON E. BUSHONG, inventor (to NASA), and DUANE P. DICKEY, inventor (to NASA) 27 Mar. 1990 11 p Filed 28 Oct. 1988

(NASA-CASE-KSC-11386-1; US-PATENT-4,912,414; US-PATENT-APPL-SN-264107; US-PATENT-CLASS-324-329)

Avail: US Patent and Trademark Office CSCL 14B

A metal detector includes a detector head having a primary or transmit coil for the transmission of electromagnetic radiation and having a plurality of secondary or receiving coils associated for having voltages induced by transmissions from the primary coil. The presence of metallic objects within the detector head affects the voltage level induced in the secondary coils, a condition which may be detected as indicative of such presence of metallic objects. Each detector head preferably includes a primary coil about the periphery, with a plurality of secondary coils, all in the same plane with the primary coil, situated axially in from the periphery of the detector head in a mutually non-overlapping configuration, preferably about the center of such detector head. A plurality of such detector heads may be supported in coplanar alignment by a common non-metallic support structure for scanning relatively larger areas at a time. The primary coil of each respective detector head may be sequentially pulsed and selectively spaced to avoid interference with adjacent detector heads, thereby avoiding certain inherent disadvantages in applying conventional single detector head frequency-dependent tuned coil technology to multiple head use in an integral metal detector system.

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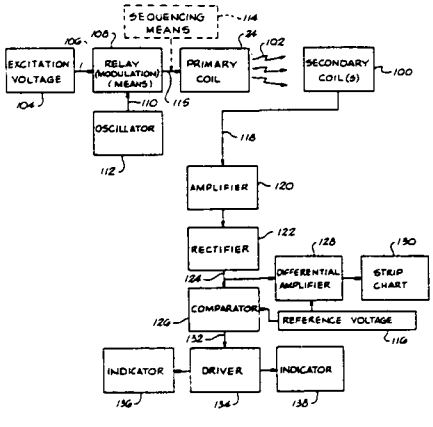

N90-22024* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

ZERO-G PHASE DETECTOR AND SEPARATOR Patent

STEVEN J. SCHNEIDER, inventor (to NASA) 27 Mar. 1990 7 p Filed 21 Mar. 1989

(NASA-CASE-LEW-14844-1; US-PATENT-4,911,738; US-PATENT-APPL-SN-326766; US-PATENT-CLASS-55-160; US-PATENT-CLASS-55-203; US-PATENT-CLASS-55-204; US-PATENT-CLASS-210-512.1; US-PATENT-CLASS-210-97)

Avail: US Patent and Trademark Office CSCL 14B

The gaseous phase is detected and then separated from a liquid phase in a fluid. This is accomplished by centrifuging the liquid phase while the gaseous phase migrates to the axis. When the expected phase is detected at a predetermined port, a signal is generated to open the liquid or gas valve at the respective outlet ports and to modulate these valves in such a manner as to withdraw fluid at the same volume rate at which it is admitted.

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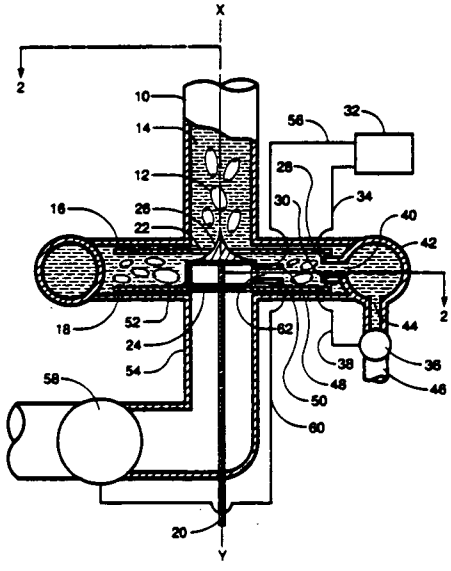

N90-22025* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

DEVICE FOR QUICKLY SENSING THE AMOUNT OF O2 IN A COMBUSTION PRODUCT GAS Patent

JAG J. SINGH, inventor (to NASA), WILLIAM T. DAVIS, inventor (to NASA), and RICHARD L. PUSTER, inventor (to NASA) 27 Mar. 1990 7 p Filed 9 Mar. 1988

(NASA-CASE-LAR-13816-1; US-PATENT-4,911,890; US-PATENT-APPL-SN-165945; US-PATENT-CLASS-422-62; US-PATENT-CLASS-422-98; US-PATENT-CLASS-422-111; US-PATENT-CLASS-422-126; US-PATENT-CLASS-436-55; US-PATENT-CLASS-436-137; US-PATENT-CLASS-436-143)

Avail: US Patent and Trademark Office CSCL 14B

A sensing device comprising an O2 sensor, a pump, a compressor, and a heater is provided to quickly sense the amount of O2 in a combustion product gas. A sample of the combustion product gas is compressed to a pressure slightly above one atmosphere by the compressor. Next, the heater heats the sample between 800 C and 900 C. Next, the pump causes the sample to be flushed against the electrode located in O2 sensor 6000 to 10,000 times per second. Reference air at approximately one atmosphere is provided to the electrode of O2 sensor. Accordingly, the O2 sensor produces a voltage which is proportional to the amount of oxygen in the combustion product gas. This voltage may be used to control the amount of O2 entering into the combustion chamber which produces the combustion product gas.

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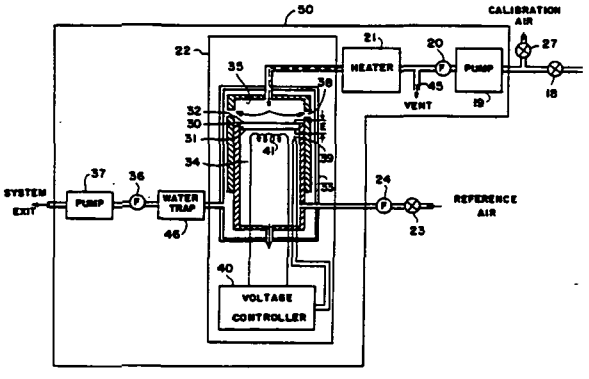

use of any moving parts or the expenditure of fuel energy.

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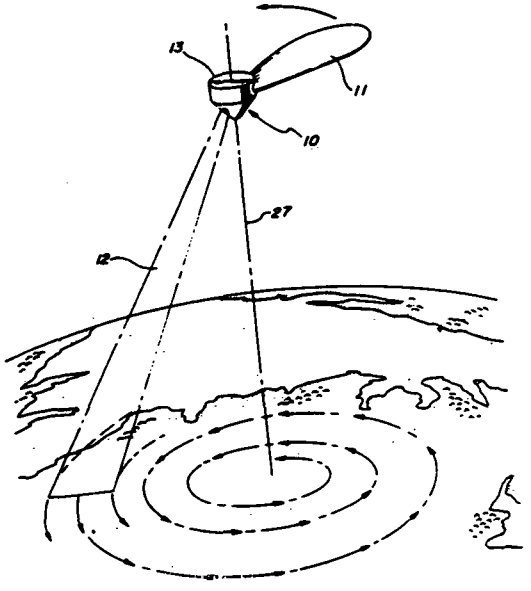


N90-22769* National Aeronautics and Space Administration. Pasadena Office, CA.

ATMOSPHERIC AUTOROTATING IMAGING DEVICE Patent

JAMES D. BURKE, inventor (to NASA) 12 Dec. 1989 7 p Filed 13 Jun. 1988 Supersedes N88-24944 (26 - 18, p 2519) Prepared in cooperation with Jet Propulsion Lab., California Inst. of Tech., Pasadena

(Contract NAS7-918)

(NASA-CASE-NPO-17390-1-CU; US-PATENT-APPL-SN-205899; US-PATENT-CLASS-244-1R; US-PATENT-CLASS-244-138A; US-PATENT-CLASS-358-109; INT-PATENT-CLASS-B64D-1/00; US-Patent-4,886,222) Avail: US Patent and Trademark Office

CSCL 14B

This invention relates to a scanning imaging device for deployment in either terrestrial or extraterrestrial atmospheres. An object of the present invention is to provide an extremely simple device that, upon deployment in an atmospheric environment, automatically rotates without the use of a propulsion system. An image detector appropriately disposed therein scans a panoramic view with each rotation of the device. Data gathered by the image detector may be transmitted to a remote receiver. The present invention may be particularly useful in the exploration of, for example, the Martian surface. The novelty of the present invention resides in the ability of the device to scan an image without the

N90-22770* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

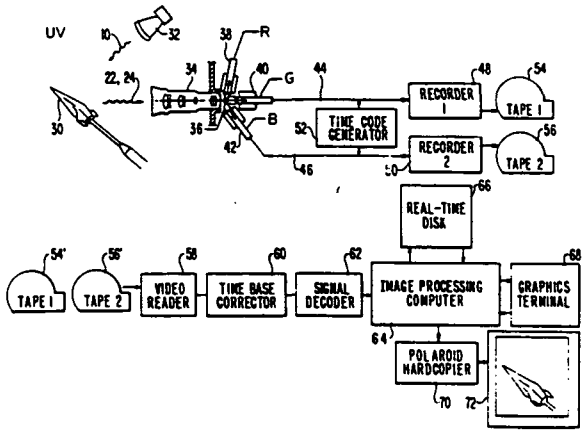
QUANTITATIVE SURFACE TEMPERATURE MEASUREMENT USING TWO-COLOR THERMOGRAPHIC PHOSPHORS AND VIDEO EQUIPMENT Patent

GREGORY M. BUCK, inventor (to NASA) 5 Dec. 1989 7 p Filed 13 Jun. 1988 Supersedes N88-30105 (26 - 24, p 3376) (NASA-CASE-LAR-13740-1; US-PATENT-APPL-SN-205900; US-PATENT-CLASS-358-93; US-PATENT-CLASS-250-459.1; US-PATENT-CLASS-250-461.1; US-PATENT-CLASS-358-113; US-PATENT-CLASS-374-162; INT-PATENT-CLASS-H04N-7/18; US-Patent-4,885,633) Avail: US Patent and Trademark Office

CSCL 14B

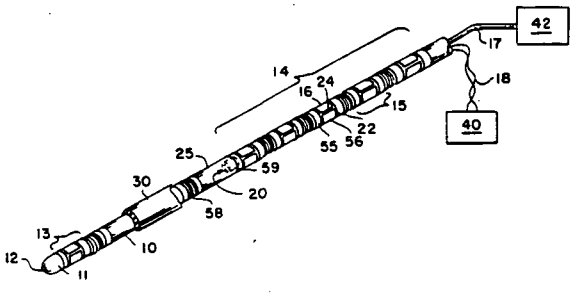
A thermal imaging system provides quantitative temperature information and is particularly useful in hypersonic wind tunnel applications. An object to be measured is prepared by coating with a two-color, ultraviolet-activated, thermographic phosphor. The colors emitted by the phosphor are detected by a conventional color video camera. A phosphor emitting blue and green light with a ratio that varies depending on temperature is used so that the intensity of light in the blue and green wavelengths detected by the blue and green tubes in the video camera can be compared. Signals representing the intensity of blue and green light at points on the surface of the model in a hypersonic wind tunnel are used to calculate a ratio of blue to green light intensity which provides

quantitative temperature information for the surface of the model.
Official Gazette of the U.S. Patent and Trademark Office



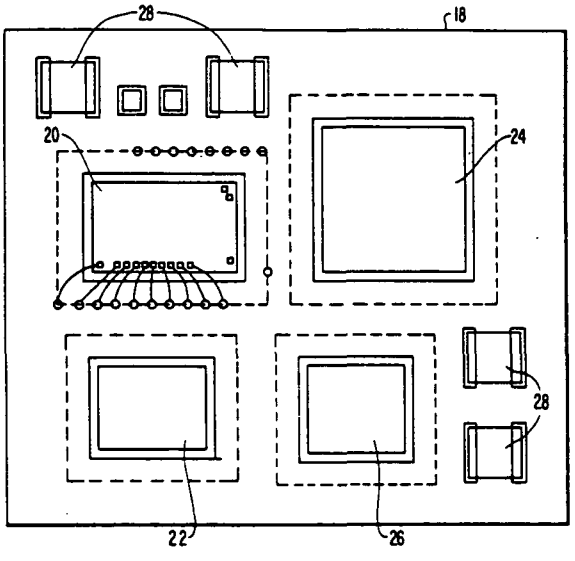
N90-23706* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CIRCUMFERENTIAL PRESSURE PROBE Patent
HARLAN K. HOLMES, inventor (to NASA), THOMAS C. MOORE, inventor (to NASA), and ANDREW J. FANTL, inventor (to NASA) (Virginia Commonwealth Univ., Richmond.) 17 Oct. 1989 7 p Filed 23 Sep. 1988 Supersedes N89-14408 (27 - 6, p 757) (NASA-CASE-LAR-13775-1; US-PATENT-4,873,990; US-PATENT-APPL-SN-248020; US-PATENT-CLASS-128-748; US-PATENT-CLASS-128-675; US-PATENT-CLASS-128-778; INT-PATENT-CLASS-A61B-5/00) Avail: US Patent and Trademark Office CSCL 14B

A probe for measuring circumferential pressure inside a body cavity is disclosed. In the preferred embodiment, a urodynamic pressure measurement probe for evaluating human urinary sphincter function is disclosed. Along the length of the probe are disposed a multiplicity of deformable wall sensors which typically comprise support tube sections with flexible side wall areas. These are arranged along the length of the probe in two areas, one just proximal to the tip for the sensing of fluid pressure inside the bladder, and five in the sensing section which is positioned within the urethra at the point at which the urinary sphincter constricts to control the flow of urine. The remainder of the length of the probe comprises multiple rigid support tube sections interspersed with flexible support tube sections in the form of bellows to provide flexibility.
Official Gazette of the U.S. Patent and Trademark Office



N90-23707* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
MINIATURIZATION OF FLIGHT DEFLECTION MEASUREMENT SYSTEM Patent
ROBERT FODALE, inventor (to NASA) and HERBERT R. HAMPTON, inventor (to NASA) (Grumman Aerospace Corp., Bethpage, NY.) 30 Jan. 1990 6 p Filed 30 Sep. 1988 (NASA-CASE-LAR-13628-1; US-PATENT-4,896,533; US-PATENT-APPL-SN-251438; US-PATENT-CLASS-73-147; US-PATENT-CLASS-340-825.69; INT-PATENT-CLASS-G01M-9/00) Avail: US Patent and Trademark Office CSCL 14B

A flight deflection measurement system is disclosed including a hybrid microchip of a receiver/decoder. The hybrid microchip decoder is mounted piggy back on the miniaturized receiver and forms an integral unit therewith. The flight deflection measurement system employing the miniaturized receiver/decoder can be used in a wind tunnel. In particular, the miniaturized receiver/decoder can be employed in a spin measurement system due to its small size and can retain already established control surface actuation functions.
Official Gazette of the U.S. Patent and Trademark Office



N90-23712* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
FATIGUE TESTING APPARATUS Patent
ROBERT J. BUZZARD, inventor (to NASA) 17 Apr. 1990 8 p Filed 21 Aug. 1989 Supersedes N89-28806 (27 - 23, p 3296) (NASA-CASE-LEW-14124-1; US-PATENT-4,916,954; US-PATENT-APPL-SN-396263; US-PATENT-CLASS-73-799; US-PATENT-CLASS-73-845; INT-PATENT-CLASS-G01N-3/32)

Avail: US Patent and Trademark Office CSCL 14B

An apparatus is provided for obtaining a single crack in fatigue loading which emanates from a predetermined starting notch in a test specimen. This crack propagates in a direction in line with that of the applied Mode 2 load. The loading may be performed either monotonically or in a cyclic fatigue.

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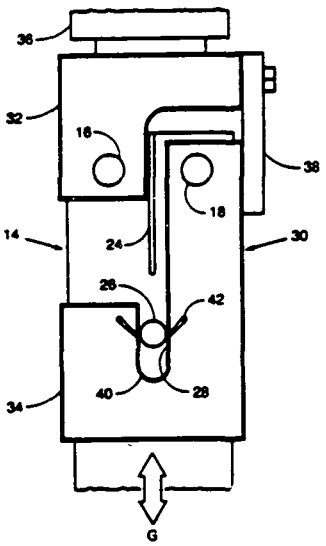

N90-23713* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

REAL-TIME SIMULATION CLOCK Patent

DONALD R. BENNINGTON, inventor (to NASA) and DANIEL J. CRAWFORD, inventor (to NASA) 17 Apr. 1990 12 p Filed 28 Sep. 1988 Continuation-in-part of abandoned US-Patent-Appl-SN-010949, filed 5 Feb. 1987 (NASA-CASE-LAR-14056-1; US-PATENT-4,918,652; US-PATENT-APPL-SN-251073; US-PATENT-APPL-SN-010949; US-PATENT-CLASS-364-900; US-PATENT-CLASS-364-933.8; US-PATENT-CLASS-364-934; US-PATENT-CLASS-364-924.4; US-PATENT-CLASS-364-925.1; US-PATENT-CLASS-364-578) Avail: US Patent and Trademark Office CSCL 14B

The invention is a clock for synchronizing operations within a high-speed, distributed data processing network. The clock is actually a distributed system comprising a central clock and multiple site clock interface units (SCIUs) which are connected by means of a fiber optic star network and which operate under control of separate clock software. The presently preferred embodiment is a part of the flight simulation system now in current use at the NASA Langley Research Center.

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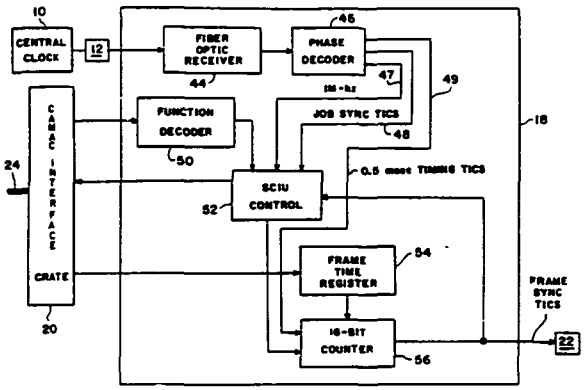


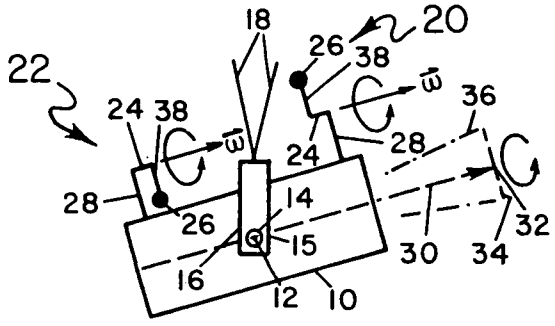
N90-26304*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

ROTATING-UNBALANCED-MASS DEVICES AND METHODS FOR SCANNING BALLOON-BORNE-EXPERIMENTS, FREE-FLYING SPACECRAFT, AND SPACE SHUTTLE/SPACE STATION ATTACHED EXPERIMENTS Patent Application

MICHAEL E. POLITES, inventor (to NASA) 23 May 1990 40 p (NASA-CASE-MFS-28425-1; NAS 1.71:MFS-28425-1; US-PATENT-APPL-SN-527462) Avail: NTIS HC A03/MF A01 CSCL 14B

A method and apparatus for scanning balloon-borne experiments, free-flying spacecraft, or gimballed experiments mounted on a space shuttle or space station, makes use of one or more rotating unbalanced mass devices for selectively generating circular, line, or raster scan patterns for the experiment line of sight. An auxiliary control system may also be used in combination with the rotating unbalanced mass device, for target acquisition, keeping the scan centered on the target, or for producing complementary motion for raster scanning. The rotating unbalanced mass makes use of a mass associated with a drive shaft, such mass having a center of gravity which is displaced from the drive shaft rotation axis. The drive shaft is driven with a substantially constant angular velocity, thereby resulting in relatively low power requirements since no acceleration or deceleration of the mass is generally involved during steady state operations. The resulting centrifugal force of the rotating unbalanced mass is used to generate desired reaction forces on the experiment or spacecraft

to create a desired scan pattern for the experiment line of sight.
NASA



third channels analog signals only when the measurement burst signal is false.
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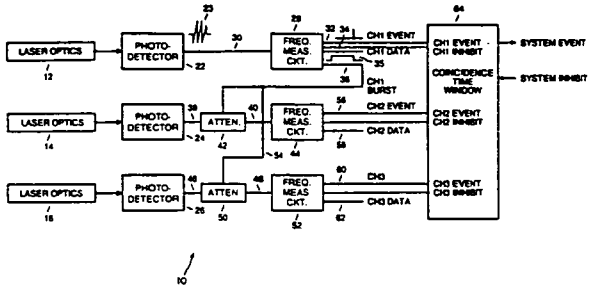

36

LASERS AND MASERS

Includes parametric amplifiers.

N90-25340* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
THREE-DIMENSIONAL LASER VELOCIMETER SIMULTANEITY DETECTOR Patent
JAMES L. BROWN, inventor (to NASA) 15 May 1990 17 p
Filed 14 Oct. 1988
(NASA-CASE-ARC-11876-1; US-PATENT-4,925,297;
US-PATENT-APPL-SN-257593; US-PATENT-CLASS-356-28.5;
US-PATENT-CLASS-356-28; INT-PATENT-CLASS-G01P-3/36)
Avail: US Patent and Trademark Office CSCL 20E

A three-dimensional laser Doppler velocimeter has laser optics for a first channel positioned to create a probe volume in space, and laser optics and for second and third channels, respectively, positioned to create entirely overlapping probe volumes in space. The probe volumes and overlap partially in space. The photodetector is positioned to receive light scattered by a particle present in the probe volume, while photodetectors and are positioned to receive light scattered by a particle present in the probe volume. The photodetector for the first channel is directly connected to provide a first channel analog signal to frequency measuring circuits. The first channel is therefore a primary channel for the system. Photodetectors and are respectively connected through a second channel analog signal attenuator to frequency measuring circuits and through a third channel analog signal attenuator to frequency measuring circuits. The second and third channels are secondary channels, with the second and third channels analog signal attenuators and controlled by the first channel measurement burst signal on line. The second and third channels analog signal attenuators and attenuate the second and

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MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

N90-20408* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
GRIPPING DEVICE Patent
GEORGE F. PARMA, inventor (to NASA) 22 Aug. 1989 11 p
Filed 19 Jul. 1988
(NASA-CASE-MSC-21365-1; US-PATENT-4,858,979;
US-PATENT-APPL-SN-221388; US-PATENT-CLASS-294-106;
US-PATENT-CLASS-294-86.4; US-PATENT-CLASS-901-38;
US-PATENT-CLASS-901-39) Avail: US Patent and Trademark Office CSCL 13I

This invention relates to a gripping device, and more particularly to one with a large moment carrying capability for handling long workpieces of various diameters and which can be particularly used as an end effector on a robotic arm.
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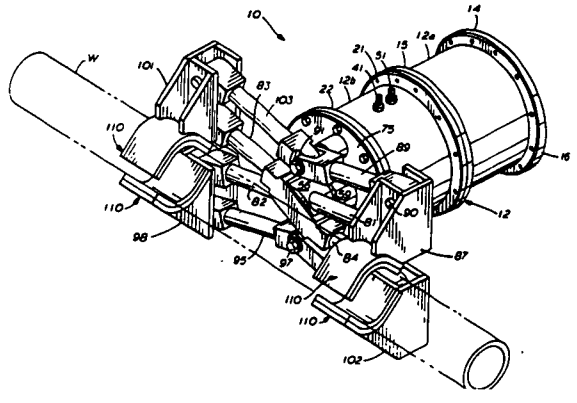

N90-20409* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
TENSILE FILM CLAMPS AND MOUNTING BLOCK FOR THE RHEOVIBRON AND AUTOVIBRON VISCOELASTOMETER Patent
DIANE M. STOAKLEY, inventor (to NASA), ANNE K. ST.CLAIR, inventor (to NASA), and BRUCE D. LITTLE, inventor (to NASA) 12 Sep. 1989 8 p Filed 4 Nov. 1988
(NASA-CASE-LAR-13696-1; US-PATENT-4,864,865; US-PATENT-APPL-SN-267146; US-PATENT-CLASS-73-831; US-PATENT-CLASS-73-860) Avail: US Patent and Trademark Office CSCL 13I

A set of film clamps and a mounting block for use in the determination of tensile modulus and damping properties of films in a manually operated or automated Rheovibron is diagrammed. These clamps and mounting block provide uniformity of sample gripping and alignment in the instrument. Operator dependence and data variability are greatly reduced.

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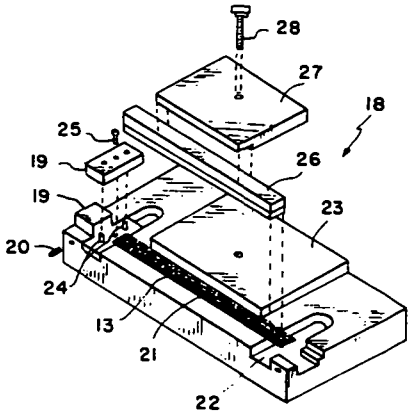

N90-21390* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
DOUBLE SWIVEL TOGGLE RELEASE Patent
GUY L. KING and WILLIAM C. SCHNEIDER 12 Sep. 1989 8 p Filed 23 Feb. 1989
(NASA-CASE-MSC-21436-1; US-PATENT-4,864,910; US-PATENT-APPL-SN-313839; US-PATENT-CLASS-89-1.14; US-PATENT-CLASS-89-1.57; US-PATENT-CLASS-102-378; US-PATENT-CLASS-194-82.26; US-PATENT-CLASS-194-82.29) Avail: US Patent and Trademark Office CSCL 13I

A pyrotechnic actuated structural release device is disclosed which is mechanically two fault tolerant for release. The device comprises a fastener plate and fastener body each attachable to one of a pair of structures to be joined. The fastener plate and the fastener body are fastened by a dual swivel toggle member. The toggle member is supported at one end on the fastener plate and mounted for universal pivotal movement thereon. Its other end is received in a central opening in the fastener body, and has a universally mounted retainer ring member. The toggle member is restrained by three retractable latching pins symmetrically disposed in equiangular spacing about the axis of the toggle member and positionable in latching engagement with the retainer ring member on the toggle member. Each pin is retractable by a pyrotechnic charge, the expanding gases of which are applied to a pressure receiving face on the latch pins to effect retraction from the ring member. While retraction of all three pins releases the ring member, the fastener is mechanically two fault tolerant since the failure of any single one or pair of the latch pins to retract results in an asymmetrical loading on the ring member and its dual pivotal movement ensures a release.

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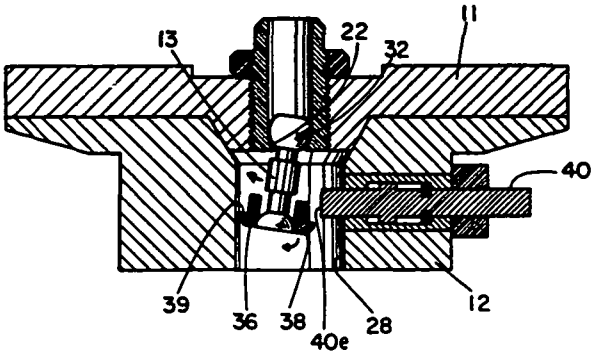

N90-22042* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
LIGHTWEIGHT PISTON ARCHITECTURE Patent
ALLAN H. TAYLOR, inventor (to NASA) and PHILIP O. RANSONE, inventor (to NASA) 20 Mar. 1990 5 p Filed 28 Sep. 1988
(NASA-CASE-LAR-13926-1; US-PATENT-4,909,133; US-PATENT-APPL-SN-250469; US-PATENT-CLASS-92-212; US-PATENT-CLASS-92-213; US-PATENT-CLASS-92-222; US-PATENT-CLASS-92-248; US-PATENT-CLASS-123-193P; US-PATENT-CLASS-29-888.046) Avail: US Patent and Trademark Office CSCL 13I

The invention is an improvement in a lightweight carbon-carbon composite piston, the improvement uses near-net shape knitted or warp-interlock preforms to improve the structural qualities of the piston. In its preferred embodiment, a one piece, tubular, closed-ended, knitted preform (a sock) of carbon fibers embedded within the matrix of the piston structure forms the crown, side wall, skirt and inner surface of the piston, and wrap-interlock preforms strengthen the piston crown and wrist pin bosses.

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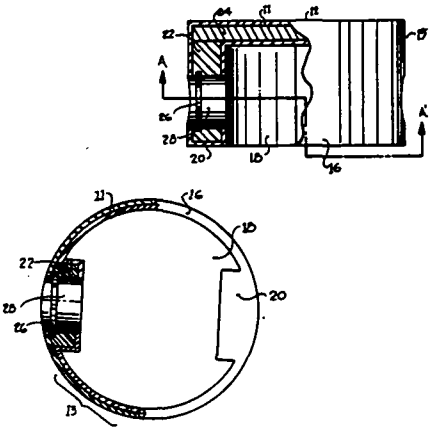

N90-23742* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CABLE SUSPENDED WINDMILL Patent
MOSES G. FARMER, inventor (to NASA) 16 Jan. 1990 8 p Filed 15 Sep. 1988
(NASA-CASE-LAR-13434-1; US-PATENT-4,894,554; US-PATENT-APPL-SN-246594; US-PATENT-CLASS-290-55; US-PATENT-CLASS-290-44; US-PATENT-CLASS-416-9; INT-PATENT-CLASS-F03D-9/00) Avail: US Patent and

Trademark Office CSCL 10A

A windmill is disclosed which includes an airframe having an upwind end and a downwind end. The first rotor is rotatably connected to the airframe, and a generator is supported by the airframe and driven by the rotor. The airframe is supported vertically in an elevated disposition by poles which extend vertically upwardly from the ground and support cables which extend between the vertical poles. Suspension cables suspend the airframe from the support cable.

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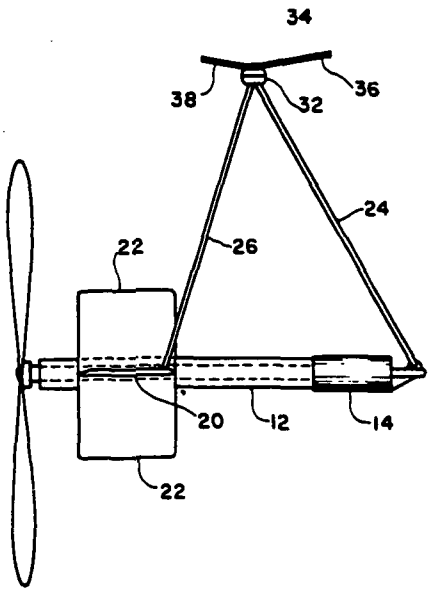

preload system and the back of the peripheral edge of the wafers.

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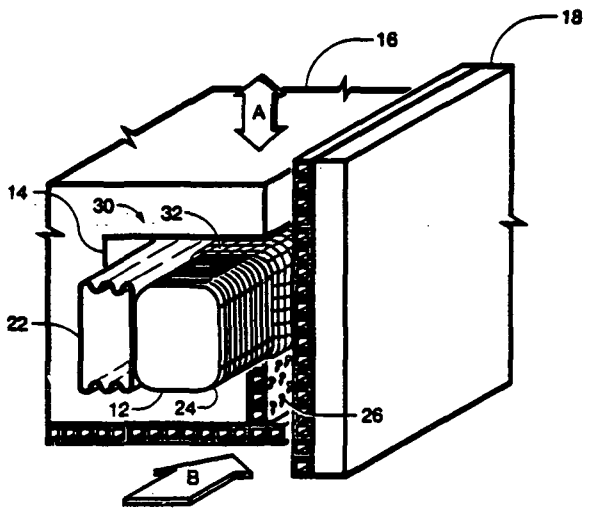


N90-23751* National Aeronautics and Space Administration. *Lewis Research Center, Cleveland, OH.*

HIGH TEMPERATURE FLEXIBLE SEAL Patent

BRUCE M. STEINETZ, inventor (to NASA) and PAUL J. SIROCKY, inventor (to NASA) 17 Apr. 1990 9 p Filed 30 Dec. 1988 Supersedes N89-28830 (27 - 23, p 3301)
(NASA-CASE-LEW-14695-1; US-PATENT-4,917,302; US-PATENT-APPL-SN-292146; US-PATENT-CLASS-239-265.11; US-PATENT-CLASS-277-34; US-PATENT-CLASS-277-158; INT-PATENT-CLASS-B64D-33/04; INT-PATENT-CLASS-F16J-15/46) Avail: US Patent and Trademark Office CSCL 11A

This device is concerned with sealing the sliding interfaces between structural panels that are roughly perpendicular to each other or whose edges are butted against one another. The gap which the seal element must seal is not uniform along the seal length requiring significant seal flexibility. The seal is mounted in a rectangular groove in a moveable structural panel. The seal comprises a plurality of rectangular shaped wafers stacked next to one another and preloaded in the axial direction to minimize leakage between wafers. The wafers are laterally preloaded to maintain sealing contact along the wafer faces which engage the adjacent wall of a sidewall using one of several approaches, such as the pressurized linear bellows. The seal accommodates distortions in the adjacent panel by relative sliding between adjacent wafers. Leakage between wafers is further minimized with good wafer surface finishes. Leakage between the seal nose and the adjacent structural panel is minimized when sealing against a distorted sidewall with relatively thin wafers and suitable seal preload apparatus. Leakage behind the seal is minimized with good groove tolerances and good sealing contact between the

N90-26339*# National Aeronautics and Space Administration. *Pasadena Office, CA.*

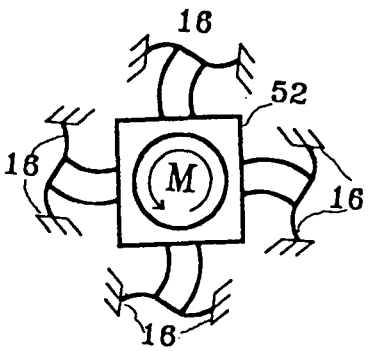
DIRECT DRIVE ROBOTIC HAND Patent Application

SZAKALY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Jun. 1990 22 p
(Contract NAS7-918)
(NASA-CASE-NPO-17917-1-CU; NAS 1.71:NPO-17917-1-CU; US-PATENT-APPL-SN-545015) Avail: NTIS HC A03/MF A01 CSCL 13I

An end effector system uses a frameless motor driving a lead screw with oppositely threaded ends to control engagement of the grippers. Grip force sensor frames are configured from rectangular, tubular boxes and act as four bar linkages to maintain gripping faces in parallel during deformation. Semiconductor strain gages are mounted as strain gage bridges on the deforming faces of the frames. Additional sensor inputs are available from a force torque sensor frame which acts as a pair of concentric rigid bodies interconnected by four beams. Each beam carries a pair of strain gage bridges so that three orthogonal axes of data may be collected. Local electronics converts serial data from an optical connection to a host processor into phase locked parallel data used to control and monitor the hand motor and gages. A state machine is used in lieu of a local processor for higher speed and greater robustness. High voltage, narrow width strain gage excitation pulses are applied simultaneously to all gages to improve the signal to noise ratio and data integrity. Parallel sample and hold circuits simultaneously sample the gages before the information is applied to analog to digital converters. D/A converters are used to remove offsets under host processor control which may result from hand orientation and/or gripping in order to maximize the sensitivity of the analog sensor data which may

be transmitted within the data constraints of the hand electronics subsystem.

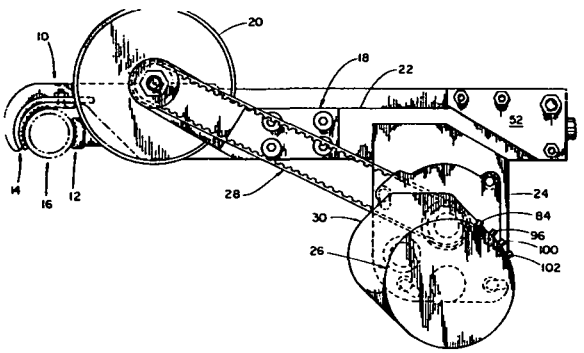
NASA



N90-26340*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
POWER SAW Patent Application
JIMMY D. BRADLEY, inventor (to NASA) 28 Feb. 1990 16 p
(NASA-CASE-MSC-21469-1; NAS 1.71:MSC-21469-1;
US-PATENT-APPL-SN-486458) Avail: NTIS HC A03/MF A01
CSCL 13I

A power saw is disclosed for space or robotic operations with jaw members for clamping to a work piece by an operation of a lever arm. The saw assembly is slidably mounted on the jaw assembly and fed into the work piece by a hand operated feed screw. The saw assembly includes a motor and gear belt. A current sensing circuit provides a current signal which actuates colored lights to visually depict the load on the saw blade during the cutting operations.

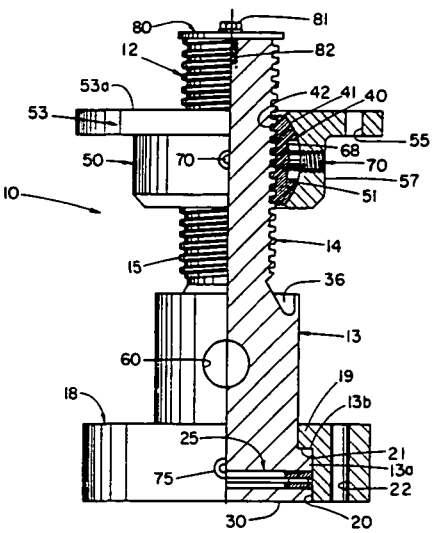
NASA



N90-26341*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
ALIGNMENT POSITIONING MECHANISM Patent Application
PETER M. FANTASIA, inventor (to NASA) 26 Jan. 1990 17 p
(NASA-CASE-MSC-21502-1; NAS 1.71:MSC-21502-1;
US-PATENT-APPL-SN-470663) Avail: NTIS HC A03/MF A01
CSCL 13I

An alignment positioning mechanism for correcting and compensating for misalignment of structures to be coupled is disclosed. The mechanism comprises a power screw with a base portion and a threaded shank portion. A mounting fixture is provided for rigidly coupling base portion to the mounting interface of a supporting structure with the axis of the screw perpendicular thereto. A traveling ball nut threaded on the power screw is formed with an external annular arcuate surface configured in the form of a spherical segment and enclosed by a ball nut housing with a conforming arcuate surface for permitting gimballed motion thereon. The ball nut housing is provided with a mounting surface which is positionable in cooperable engagement with the mounting interface of a primary structure to be coupled to the supporting structure. Cooperative means are provided on the ball nut and ball nut housing, respectively, for positioning the ball nut and ball nut housing in relative gimballed position within a predetermined range of relative angular relationship whereby severe structural stresses due to unequal loadings and undesirable bending moments on the mechanism are avoided.

NASA

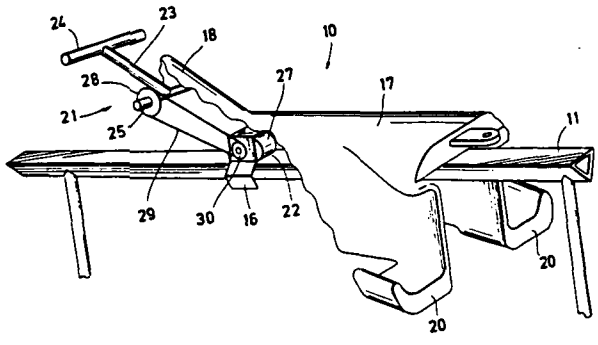


N90-26342*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
BIDIRECTIONAL DRIVE AND BRAKE MECHANISM Patent Application
SCOTT A. SWAN, inventor (to NASA) 23 May 1990 19 p
(NASA-CASE-MSC-21540-1; NAS 1.71:MSC-21540-1;
US-PATENT-APPL-SN-527508) Avail: NTIS HC A03/MF A01
CSCL 13I

A space transport vehicle is disclosed as including a body which is arranged to be movably mounted on an elongated guide member disposed in outer space and driven therealong. A drive wheel is mounted on a drive shaft and arranged to be positioned in rolling engagement with the elongated guide carrying the vehicle. A brake member is arranged on the drive shaft for movement into and out of engagement with an adjacent surface of the drive wheel. An actuator is mounted on the body to be manually moved back and forth between spaced positions in an arc of movement. A ratchet-and-pawl mechanism is arranged to operate upon movements of the actuator in one direction between first and second positions for coupling the actuator to the drive wheel to incrementally rotate the wheel in one rotational direction and to operate upon movements of the actuator in the opposite direction for uncoupling the actuator from the wheel. The brake member is threadedly coupled to the drive shaft in order that the brake member will be operated only when the actuator is moved on beyond its first and second positions for shifting the brake member along

the drive shaft and into frictional engagement with the adjacent surface on the drive wheel.

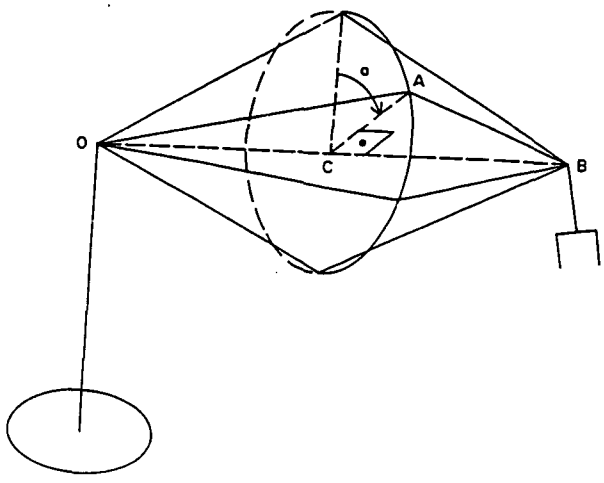
NASA



N90-27110*# National Aeronautics and Space Administration. Pasadena Office, CA.
METHOD AND APPARATUS FOR CONFIGURATION CONTROL OF REDUNDANT ROBOTS Patent Application
HOMAYOUN SERAJI, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Dec. 1989 85 p
(Contract NAS7-918)
(NASA-CASE-NPO-17801-1-CU; NAS 1.71:NPO-17801-1-CU; US-PATENT-APPL-SN-459029) Avail: NTIS HC A05/MF A01
CSCL 13I

A method and apparatus to control a robot or manipulator configuration over the entire motion based on augmentation of the manipulator forward kinematics is disclosed. A set of kinematic functions is defined in Cartesian or joint space to reflect the desirable configuration that will be achieved in addition to the specified end-effector motion. The user-defined kinematic functions and the end-effector Cartesian coordinates are combined to form a set of task-related configuration variables as generalized coordinates for the manipulator. A task-based adaptive scheme is then utilized to directly control the configuration variables so as to achieve tracking of some desired reference trajectories throughout the robot motion. This accomplishes the basic task of desired end-effector motion, while utilizing the redundancy to achieve any additional task through the desired time variation of the kinematic functions. The present invention can also be used for optimization of any kinematic objective function, or for satisfaction of a set of kinematic inequality constraints, as in an obstacle avoidance problem. In contrast to pseudoinverse-based methods, the configuration control scheme ensures cyclic motion of the manipulator, which is an essential requirement for repetitive operations. The control law is simple and computationally very fast, and does not require either the complex manipulator dynamic model or the complicated inverse kinematic transformation. The configuration control scheme can alternatively be implemented in joint space.

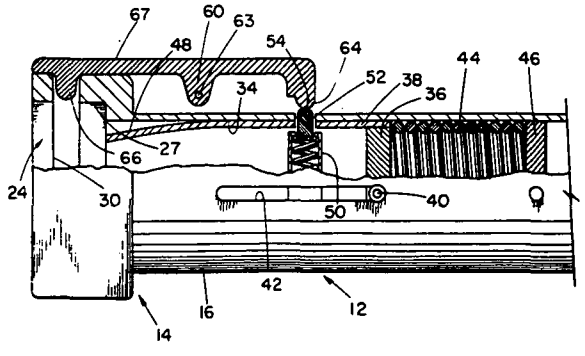
NASA



N90-27111*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
QUICK CONNECT COUPLING Patent Application
BENNY B. SPRAGUE, inventor (to NASA) 30 Mar. 1990 11 p
(NASA-CASE-MSC-21539-1; NAS 1.71:MSC-21539-1; US-PATENT-APPL-SN-503410) Avail: NTIS HC A03/MF A01
CSCL 13K

A coupling device has a transversely arranged, open-end groove in a flange attached to a pipe end. The groove in the flange receives a circumferentially arranged locking flange element on the other coupling member and permits alignment of the bores of the coupling members when the locking flange element is in the open end groove. Upon alignment of the bores of the coupling members, a trigger member is activated to automatically release a spring biased tubular member in one of the coupling members. The tubular member has a conical end which is displaced into the other coupling member to lock the coupling members to one another. A tensioning nut is threadedly movable on a coupling member so as to be moved into tightening engagement with the other coupling member.

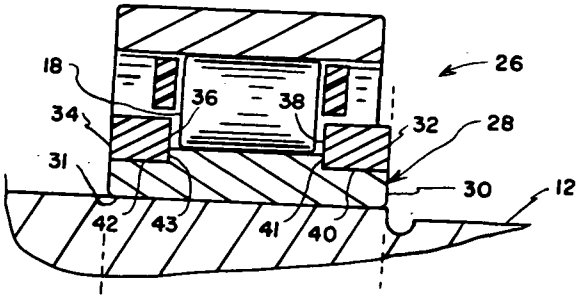
NASA



N90-27112*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
CRYOGENIC ANTI-FRICTION BEARING WITH INNER RACE Patent Application
DALE H. BLOUNT, inventor (to NASA) 31 Jan. 1990 16 p
(NASA-CASE-MFS-28384-1; NAS 1.71:MFS-28384-1; US-PATENT-APPL-SN-473064) Avail: NTIS HC A03/MF A01
CSCL 13K

This invention consists of a bearing designed to operate in a cryogenic environment and which has an inner raceway generally constructed as an annular band fitted by an interference fit to a rotating shaft. A pair of annular tension bands are fitted onto opposed sides of the band and function to firmly clamp the raceway to the shaft. This occurs because the tension bands are constructed of a material which, when cooled to approximately -335 F shrinks more than the raceway and the shaft to which it is fitted. The bands further relax somewhat at room temperature and permit the interference fit between the raceway and the shaft to be sized such that the raceway is not overly stressed.

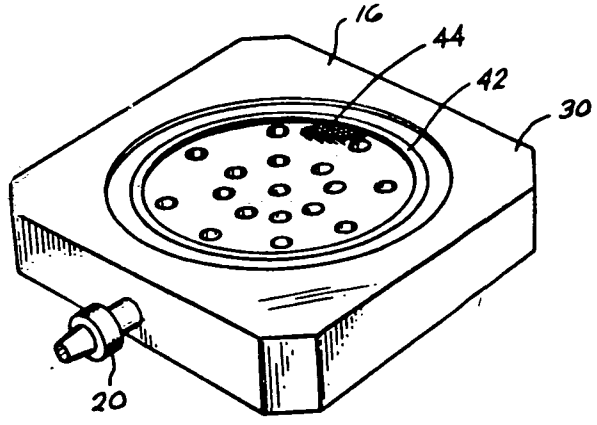
NASA



N90-27113*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
SAMPLE HOLDER SUPPORT FOR MICROSCOPES Patent Application
ANTHONY BERRY, inventor (to NASA) and BILLY H. NERREN, inventor (to NASA) 15 May 1990 11 p
(NASA-CASE-MFS-28420-1; NAS 1.71:MFS-28420-1; US-PATENT-APPL-SN-523675) Avail: NTIS HC A03/MF A01 CSCL 13I

A sample filter holder is disclosed for use with a microscope for holding the filter in a planar condition on the stage of the microscope so that automatic focusing of the microscope can be performed on particle samples dispersed on the filter. The holder includes a base having a well communicating with an inlet port which is connected to a suction pump. A screen assembly is positioned within the well. The screen assembly includes a disk having a screen positioned on its top surface and secured to the disk at the peripheral edge of the screen. Small bores communicate the outer surface of the screen with the well. The filter is placed on the screen and is held in a flat disposition by the suction forces.

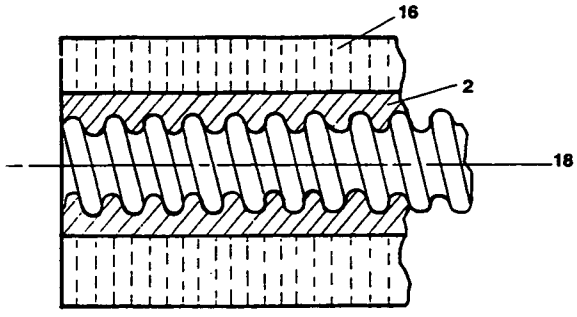
NASA



N90-27114*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
BRAIDED COMPOSITE FASTENERS AND METHOD FOR PRODUCING SAME Patent Application
JAMES WAYNE SAWYER, inventor (to NASA) 18 Oct. 1989 14 p
(NASA-CASE-LAR-14062-1; NAS 1.71:LAR-14062-1; US-PATENT-APPL-SN-423089) Avail: NTIS HC A03/MF A01 CSCL 13K

The invention is a high-temperature resistant fastener made of composite material and a method for producing such a fastener. A braiding process is used to produce a preform, which is then molded. The molding process and the unique characteristics of braided preforms allow one of a variety of differently shaped fastening means such as threads to be molded as an integral part of the finished fastener.

NASA

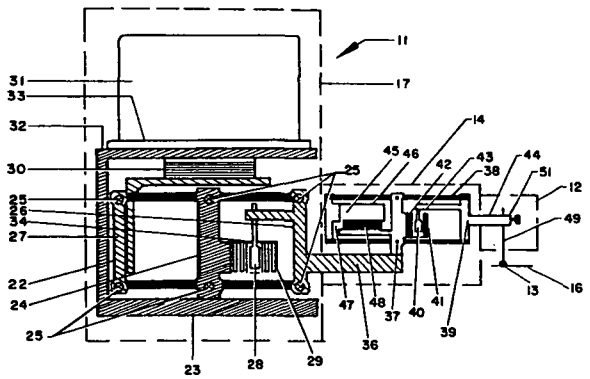


N90-27115*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD AND APPARATUS FOR APPLYING A MECHANICAL FORCE TO SURFACE Patent Application
FRANK H. SUPPLEE, JR., inventor (to NASA) and PING TCHENG, inventor (to NASA) 27 Nov. 1989 17 p
(NASA-CASE-LAR-14009-1; NAS 1.71:LAR-14009-1; US-PATENT-APPL-SN-441671) Avail: NTIS HC A03/MF A01 CSCL 13I

The invention is a method of and apparatus for applying a mechanical force to a nerve surface by means of a displaceable probe assembly. The probe assembly is affixed to a force transducer selectively movable by means of an actuator that includes the steps of positioning the probe assembly on the nerve surface by moving the movable actuator and force transducer to a first calibrated position to apply a first determined level of mechanical force to the nerve surface, moving the actuator and the probe assembly relative to the nerve surface while continuously measuring the force actually applied to the nerve surface

irrespective of the resulting movement of the nerve surface.

NASA



N90-27116*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

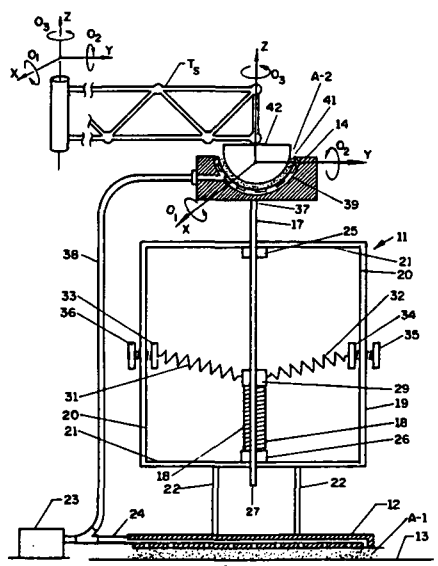
SUSPENSION MECHANISM AND METHOD Patent Application

STANLEY E. WOODARD, inventor (to NASA) and VICTOR M. COOLEY, inventor (to NASA) 31 Jan. 1990 10 p

(NASA-CASE-LAR-14142-1; NAS 1.71:LAR-14142-1; US-PATENT-APPL-SN-473030) Avail: NTIS HC A02/MF A01 CSCL 13I

The invention is a suspension mechanism and method for suspending a flexible test structure T(sub s) subjected to large horizontal translational and vibratory motions. A zero-spring rate mechanism between air cushions A-1 and A-2 established by air bearings support an end of the test structure T(sub s) on a flat surface of a table permitting up to six degrees of freedom of motion of the suspended test structure T(sub s) substantially unconstrained by the suspension mechanism.

NASA



38

QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N90-23756* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

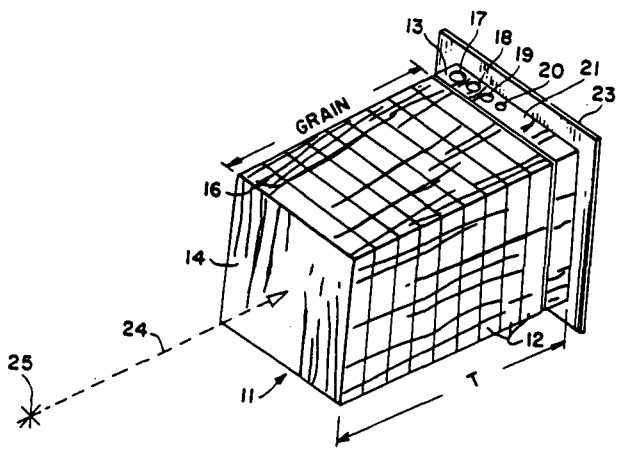
METHOD OF RADIOGRAPHIC INSPECTION OF WOODEN MEMBERS Patent

MAGGIE L. BERRY, inventor (to NASA) and ROBERT F. BERRY, JR., inventor (to NASA) 6 Feb. 1990 6 p Filed 25 Nov. 1987 Supersedes N88-23983 (26 - 17, p 2346)

(NASA-CASE-LAR-13724-1; US-PATENT-4,899,356; US-PATENT-APPL-SN-125678; US-PATENT-CLASS-378-58; US-PATENT-CLASS-378-51; INT-PATENT-CLASS-G01B-15/06) Avail: US Patent and Trademark Office CSCL 14D

The invention is a method to be used for radiographic inspection of a wooden specimen for internal defects which includes the steps of introducing a radiopaque penetrant into any internal defects in the specimen through surface openings; passing a beam of radiation through a portion of the specimen to be inspected; and making a radiographic film image of the radiation passing through the specimen, with the radiopaque penetrant in the specimen absorbing the radiation passing through it, thereby enhancing the resulting image of the internal defects in the specimen.

Official Gazette of the U.S. Patent and Trademark Office



43

EARTH RESOURCES AND REMOTE SENSING

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

N90-26384*# National Aeronautics and Space Administration. Pasadena Office, CA.

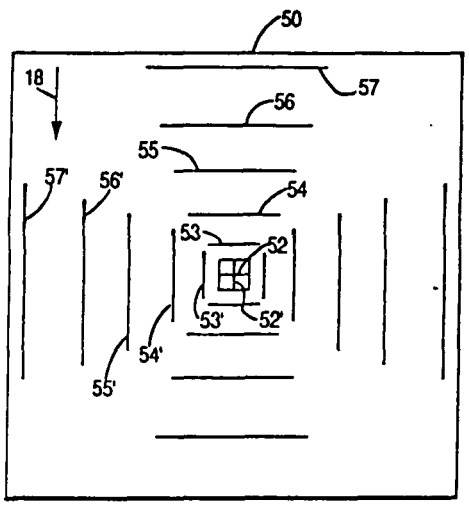
IMPROVING THE GEOMETRIC FIDELITY OF IMAGING SYSTEMS EMPLOYING SENSOR ARRAYS Patent Application

KENNETH L. JONES, inventor (to NASA) (Jet Propulsion Lab.,

California Inst. of Tech., Pasadena.) 28 Jun. 1990 19 p
(Contract NAS7-918)
(NASA-CASE-NPO-17970-1-CU; NAS 1.71:NPO-17970-1-CU;
US-PATENT-APPL-SN-545014) Avail: NTIS HC A03/MF A01
CSCL 14B

A sensor assembly to be carried on an aircraft or spacecraft which will travel along an arbitrary flight path, for providing an image of terrain over which the craft travels, is disclosed. The assembly includes a main linear sensor array and a plurality of auxiliary sensor arrays oriented parallel to, and at respectively different distances from, the main array. By comparing the image signals produced by the main sensor array with those produced by each auxiliary array, information relating to variations in velocity of the craft carrying the assembly can be obtained. The signals from each auxiliary array will provide information relating to a respectively different frequency range.

NASA



51

LIFE SCIENCES (GENERAL)

N90-27239*# National Aeronautics and Space Administration. Pasadena Office, CA.
PSEUDOMONAS DIAGNOSTIC ASSAY Patent Application
RUTH MARGALIT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 30 Mar. 1990 10 p
(Contract NAS7-918)
(NASA-CASE-NPO-17653-1-CU; NAS 1.71:NPO-17653-1-CU;
US-PATENT-APPL-SN-501908) Avail: NTIS HC A02/MF A01
CSCL 06C

A method for the detection of Pseudomonas bacteria is described where an Azurin-specific antibody is employed for detecting the presence of Azurin in a test sample. The detection of the presence of Azurin in the sample is a conclusive indicator of the presence of the Pseudomonas bacteria since the Azurin protein is a specific marker for this bacterial strain.

NASA

52

AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

N90-20616* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
HUMAN SERUM ALBUMIN CRYSTALS AND METHOD OF PREPARATION Patent
DANIEL C. CARTER, inventor (to NASA) 23 May 1989 8 p
Filed 20 Aug. 1987
(NASA-CASE-MFS-28234-1; US-PATENT-4,833,233;
US-PATENT-APPL-SN-087281; US-PATENT-CLASS-530-363;
US-PATENT-CLASS-530-362; US-PATENT-CLASS-530-364;
US-PATENT-CLASS-530-387; US-PATENT-CLASS-530-422;
US-PATENT-CLASS-427-2; US-PATENT-CLASS-428-408) Avail:
US Patent and Trademark Office CSCL 06E

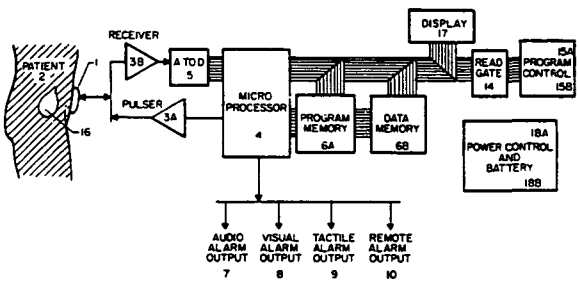
Human serum albumin (HSA) crystals are provided in the form of tetragonal plates having the space groups P42(sub 1)2, the crystals being grown to sizes in excess of 0.5 mm in two dimensions and a thickness of 0.1 mm. Growth of the crystals is carried out by a hanging drop method wherein a precipitant solution containing polyethylene glycol (PEG) and a phosphate buffer is mixed with an HSA solution, and a droplet of mixed solution is suspended over a well of precipitant solution. Crystals grow to the desired size in 3 to 7 days. Concentration of reagents, pH and other parameters are controlled within prescribed limits. The resulting crystals exhibit a size and quality such as to allow performance of x ray diffraction studies and enable the conduct of drug binding studies as well as genetic engineering studies.

Official Gazette of the U.S. Patent and Trademark Office

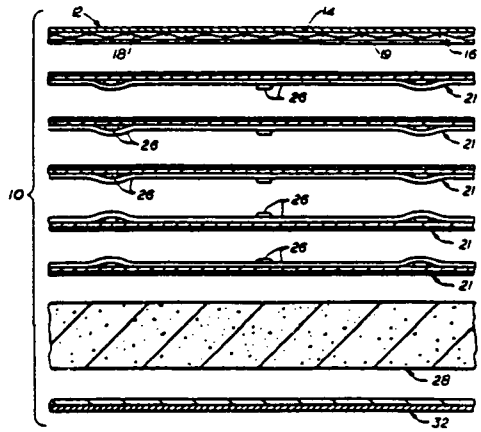
N90-21519* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
RAPIDLY QUANTIFYING THE RELATIVE DISTENTION OF A HUMAN BLADDER Patent
JOHN A. COMPANION, inventor (to NASA), JOSEPH S. HEYMAN, inventor (to NASA), BETH A. MINEO, inventor (to NASA), ALBERT R. CAVALIER, inventor (to NASA), and TRAVIS N. BLALOCK, inventor (to NASA) (Department of Education, Washington, DC.) 1 Aug. 1989 13 p Filed 10 Nov. 1987 Continuation-in-part of US-Patent-Appl-SN-929869, filed 13 Nov. 1986, abandoned
(NASA-CASE-LAR-13901-1-NP; US-PATENT-4,852,578;
US-PATENT-APPL-SN-118993; US-PATENT-APPL-SN-929869;
US-PATENT-CLASS-128-661.03) Avail: US Patent and Trademark Office CSCL 06B

A device and method of rapidly quantifying the relative distention of the bladder in a human subject are disclosed. The ultrasonic transducer which is positioned on the subject in proximity to the bladder is excited by a pulser under the command of a microprocessor to launch an acoustic wave into the patient. This wave interacts with the bladder walls and is reflected back to the ultrasonic transducer, when it is received, amplified and processed by the receiver. The resulting signal is digitized by an analog-to-digital converter under the command of the microprocessor and is stored in the data memory. The software in the microprocessor determines the relative distention of the bladder as a function of the propagated ultrasonic energy; and based on programmed scientific measurements and individual, anatomical, and behavioral characterists of the specific subject as contained in the program memory, sends out a signal to turn on any or all of the audible alarm, the visible alarm, the tactile alarm,

and the remote wireless alarm.
Official Gazette of the U.S. Patent and Trademark Office



multi-layers together as a laminar composite.
Official Gazette of the U.S. Patent and Trademark Office



54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

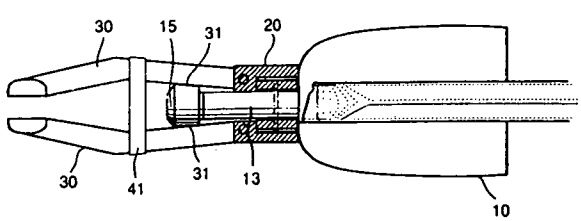
N90-25498* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
HAZARDS PROTECTION FOR SPACE SUITS AND SPACECRAFT Patent
JOSEPH J. KOSMO, inventor (to NASA) and FREDERIC S. DAWN, inventor (to NASA) 8 May 1990 9 p Filed 30 Jun. 1988 Supersedes N89-12206 (27 - 3, p 367)
(NASA-CASE-MSC-21366-1; US-PATENT-4,923,741; US-PATENT-APPL-SN-213880; US-PATENT-CLASS-428-252; US-PATENT-CLASS-428-290; US-PATENT-CLASS-428-328; US-PATENT-CLASS-428-422; US-PATENT-CLASS-428-447; US-PATENT-CLASS-428-458; US-PATENT-CLASS-428-474.4)
Avail: US Patent and Trademark Office CSCL 06K

A flexible multi-layered covering article for protection against the hazards of exposure to the environment of outer space is disclosed. The covering includes an outer layer section comprising an outermost lamina of woven expanded tetrafluoroethylene yarns (Gore Tex) for protecting against abrasion and tearing, an underlying weave of meta-aramid yarns (Nomex) and para-aramid yarns (Kevlar) for particle impart protection, and electrostatic charge dissipation and control system incorporated therein, and a chemical contaminants control barrier applied as a coating. A middle section includes a succession of thermal insulating layers of polymeric thermoplastic or thermoforming material, each of which is coated with a metal deposit of high infra-red emissivity and low solar radiation absorption characteristics and separated from adjacent insulating layers by a low thermal conductance material. The covering further includes a radiation attenuating layer of a tungsten-loaded polymeric elastomer binder for protecting against bremsstrahlung radiation and an inner layer of rip-stop polyester material for abrasion protection. A chloroprene coating may be supplied the polyester-material for added micrometeroid protection. Securing means of low heat conductance material secures the

N90-27261*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
ROTATIONALLY ACTUATED PROSTHETIC HELPING HAND Patent Application
WILLIAM E. NORTON, inventor (to NASA), JEWELL G. BELCHER, JR., inventor (to NASA), JAMES R. CARDEN, inventor (to NASA), and THOMAS W. VEST, inventor (to NASA) (Membrane Systems, Inc., San Diego, CA.) 12 Apr. 1990 14 p
(NASA-CASE-MFS-28426-1; NAS 1.71:MFS-28426-1; US-PATENT-APPL-SN-508154) Avail: NTIS HC A03/MF A01 CSCL 05H

A prosthetic device for below-the-elbow amputees having a cuff, a stem, a housing, two hook-like fingers, an elastic band for holding the fingers together, and a brace, is disclosed. The fingers are pivotally mounted on a housing that it secured to the amputee's upper arm with the brace. The stem, which also contains a cam, is rotationally mounted within the housing and is secured to the cuff, which fits over the amputee's stump. By rotating the cammed stem between the fingers with the lower arm, the amputee can open and close the fingers.

NASA



60

COMPUTER OPERATIONS AND HARDWARE

Includes hardware for computer graphics, firmware, and data processing.

N90-21525* National Aeronautics and Space Administration. Pasadena Office, CA.

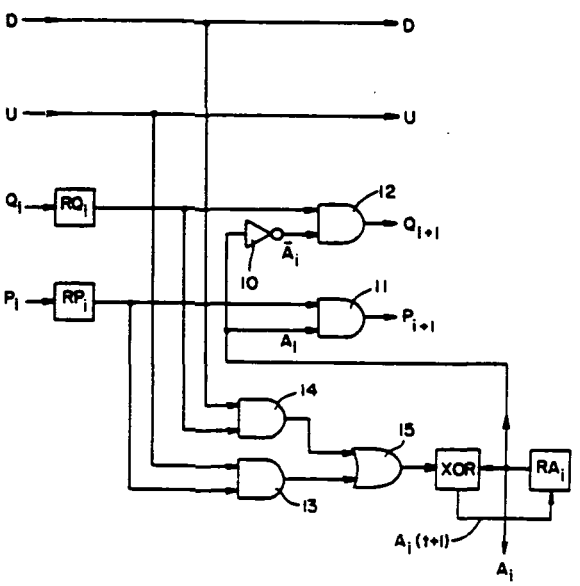
VLSI BINARY UPDOWN COUNTER Patent

TRIEU-KIE TRUONG, inventor (to NASA), IN-SHEK HSU, inventor (to NASA), and IRVING S. REED, inventor (to NASA) (California Inst. of Tech., Pasadena.) 4 Jul. 1989 7 p Filed 13 Jan. 1988

(NASA-CASE-NPO-17205-1-CU; US-PATENT-4,845,728; US-PATENT-APPL-SN-143434; US-PATENT-CLASS-377-123; US-PATENT-CLASS-377-111; US-PATENT-CLASS-377-114; US-PATENT-CLASS-377-116; US-PATENT-CLASS-377-126; US-PATENT-CLASS-377-69; US-PATENT-CLASS-377-79) Avail: US Patent and Trademark Office CSCL 09B

A pipeline binary updown counter is comprised of simple stages that may be readily replicated. Each stage is defined by the Boolean logic equation: A(sub n)(t) = A(sub n)(t - 1) exclusive OR (U AND P(sub n)) inclusive OR (D AND Q(sub n)), where A(sub n)(t) denotes the value of the nth bit at time t. The input to the counter has three values represented by two binary signals U and D such that if both are zero, the input is zero, if U = 0 and D = 1, the input is -1 and if U = 1 and D = 0, the input is +1. P(sub n) represents a product of A(sub k)'s for 1 is less than or equal to k is less than or equal to -1, while Q(sub n) represents the product of bar A's for 1 is less than or equal to K is less than or equal to n - 1, where bar A(sub k) is the complement of A(sub k) and P(sub n) and Q(sub n) are expressed as the following two equations: P(sub n) = A(sub n - 1) A(sub n - 2)...A(sub 1) and Q(sub n) = bar A(sub n - 1) bar A(sub n - 2)...bar A(sub 1), which can be written in recursive form as P(sub n) = P(sub n - 1) AND bar A(sub n - 1) and Q(sub n) = Q(sub n - 1) AND bar A(sub n - 1) with the initial values P(sub 1) = 1 and Q(sub 1) = 1.

Official Gazette of the U.S. Patent and Trademark Office



N90-21527* National Aeronautics and Space Administration. Pasadena Office, CA.

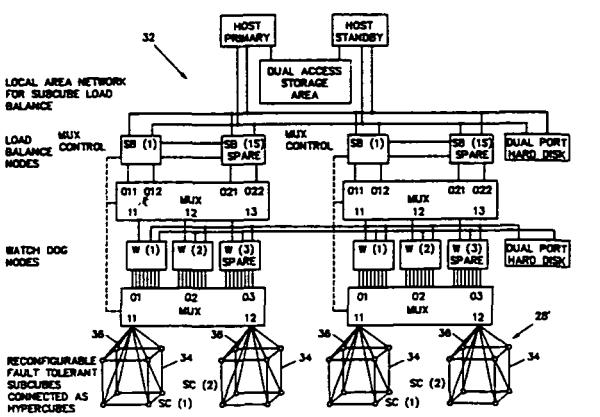
FAULT TOLERANT HYPERCUBE COMPUTER SYSTEM ARCHITECTURE Patent

HERB S. MADAN, inventor (to NASA) and EDWARD CHOW, inventor (to NASA) (California Inst. of Tech., Pasadena.) 19 Sep. 1989 18 p Filed 29 Oct. 1987

(NASA-CASE-NPO-16859-1-CU; US-PATENT-4,868,818; US-PATENT-APPL-SN-113956; US-PATENT-CLASS-371-11.3; US-PATENT-CLASS-364-229.4; US-PATENT-CLASS-364-267.9; US-PATENT-CLASS-364-975.5; US-PATENT-CLASS-364-940.67; US-PATENT-CLASS-364-942.51; US-PATENT-CLASS-364-944) Avail: US Patent and Trademark Office CSCL 09B

A fault-tolerant multiprocessor computer system of the hypercube type comprising a hierarchy of computers of like kind which can be functionally substituted for one another as necessary is disclosed. Communication between the working nodes is via one communications network while communications between the working nodes and watch dog nodes and load balancing nodes higher in the structure is via another communications network separate from the first. A typical branch of the hierarchy reporting to a master node or host computer comprises, a plurality of first computing nodes; a first network of message conducting paths for interconnecting the first computing nodes as a hypercube. The first network provides a path for message transfer between the first computing nodes; a first watch dog node; and a second network of message connecting paths for connecting the first computing nodes to the first watch dog node independent from the first network, the second network provides an independent path for test message and reconfiguration affecting transfers between the first computing nodes and the first switch watch dog node. There is additionally, a plurality of second computing nodes; a third network of message conducting paths for interconnecting the second computing nodes as a hypercube. The third network provides a path for message transfer between the second computing nodes; a fourth network of message conducting paths for connecting the second computing nodes to the first watch dog node independent from the third network. The fourth network provides an independent path for test message and reconfiguration affecting transfers between the second computing nodes and the first watch dog node; and a first multiplexer disposed between the first watch dog node and the second and fourth networks for allowing the first watch dog node to selectively communicate with individual ones of the computing nodes through the second and fourth networks; as well as, a second watch dog node operably connected to the first multiplexer whereby the second watch dog node can selectively communicate with individual ones of the computing nodes through the second and fourth networks. The branch is completed by a first load balancing node; and a second multiplexer connected between the first load balancing node and the first and second watch dog nodes, allowing the first load balancing node to selectively communicate with the first and second watch dog nodes.

Official Gazette of the U.S. Patent and Trademark Office



N90-25583* National Aeronautics and Space Administration. Pasadena Office, CA.
COMPUTER ACCESS SECURITY CODE SYSTEM Patent
EARL R. COLLINS, JR., inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 15 May 1990 13 p Filed 5 Dec. 1988 Supersedes N89-29955 (27 - 24, p 3490)
(Contract NAS7-918)
(NASA-CASE-NPO-17525-1-CU; US-PATENT-4,926,481; US-PATENT-APPL-SN-279630; US-PATENT-CLASS-380-25; US-PATENT-CLASS-380-45; US-PATENT-CLASS-380-49; INT-PATENT-CLASS-H02L-9/04) Avail: US Patent and Trademark Office CSCL 09B

A security code system for controlling access to computer and computer-controlled entry situations comprises a plurality of subsets of alpha-numeric characters disposed in random order in matrices of at least two dimensions forming theoretical rectangles, cubes, etc., such that when access is desired, at least one pair of previously unused character subsets not found in the same row or column of the matrix is chosen at random and transmitted by the computer. The proper response to gain access is transmittal of subsets which complete the rectangle, and/or a parallelepiped whose opposite corners were defined by first groups of code. Once used, subsets are not used again to absolutely defeat unauthorized access by eavesdropping, and the like.

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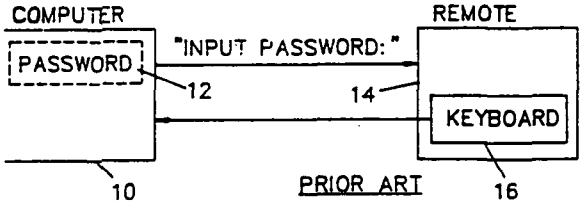
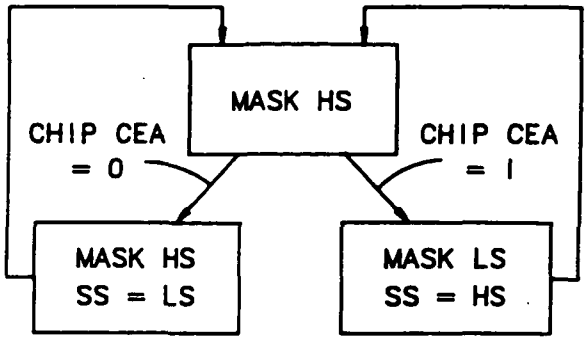


N90-26518*# National Aeronautics and Space Administration. Pasadena Office, CA.
SELF-CHECKING ON-LINE TESTABLE STATIC RAM Patent Application
S. CHAU, inventor (to NASA) and D. RENNELS, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 26 Jun. 1990 26 p
(Contract NAS7-918)
(NASA-CASE-NPO-17939-1-CU; NAS 1.71:NPO-17939-1-CU; US-PATENT-APPL-SN-543915) Avail: NTIS HC A03/MF A01 CSCL 09B

This is a fault-tolerant random access memory for use in fault-tolerant computers. It comprises a plurality of memory chips each comprising a plurality of on-line testable and correctable memory cells disposed in rows and columns for holding individually addressable binary bits and provision for error detection incorporated into each memory cell for outputting an error signal whenever a transient error occurs therein. In one embodiment, each of the memory cells comprises a pair of static memory sub-cells for simultaneously receiving and holding a common binary data bit written to the memory cell and the error detection provision comprises comparator logic for continuously sensing and comparing the contents of the memory sub-cells to one another and for outputting the error signal whenever the contents do not match. In another embodiment, each of the memory cells comprises a static memory sub-cell and a dynamic memory sub-cell for simultaneously receiving and holding a common binary data bit written to the memory cell and the error detection provision comprises comparator logic for continuously sensing and comparing the contents of the static memory sub-cell to the dynamic memory sub-cell and for outputting the error signal whenever the contents do not match. Capability for correction of errors is also included.

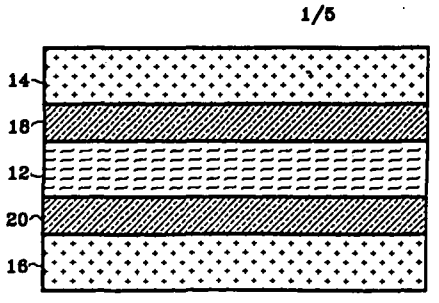
NASA



N90-26519*# National Aeronautics and Space Administration. Pasadena Office, CA.
HIGH SPEED MAGNETO-RESISTIVE RANDOM ACCESS MEMORY Patent Application
WU, inventor (to NASA), STADLER, inventor (to NASA), and KATTI, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Jun. 1990 25 p
(Contract NAS7-918)
(NASA-CASE-NPO-17954-1-CU; NAS 1.71:NPO-17954-1-CU; US-PATENT-APPL-SN-545019) Avail: NTIS HC A03/MF A01 CSCL 09B

A high speed read MRAM memory element is configured from a sandwich of magnetizable, ferromagnetic film surrounding a magneto-resistive film which may be ferromagnetic or not. One outer ferromagnetic film has a higher coercive force than the other and therefore remains magnetized in one sense while the other may be switched in sense by a switching magnetic field. The magneto-resistive film is therefore sensitive to the amplitude of the resultant field between the outer ferromagnetic films and may be constructed of a high resistivity, high magneto-resistive material capable of higher sensing currents. This permits higher read voltages and therefore faster read operations. Alternate embodiments with perpendicular anisotropy, and in-plane anisotropy are shown, including an embodiment which uses high permeability guides to direct the closing flux path through the magneto-resistive material. High density, high speed, radiation hard, memory matrices may be constructed from these memory elements.

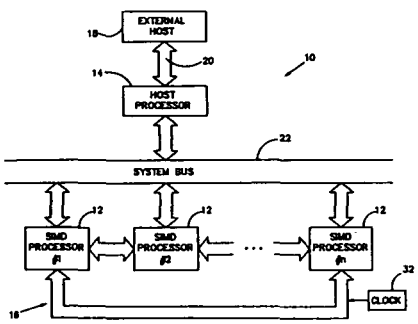
NASA



N90-27268*# National Aeronautics and Space Administration. Pasadena Office, CA.
SPECIAL PURPOSE PARALLEL COMPUTER ARCHITECTURE FOR REAL-TIME CONTROL AND SIMULATION IN ROBOTIC APPLICATIONS Patent Application
AMIR FIJANY, inventor (to NASA) and ANTAL K. BEJCZY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Dec. 1989 18 p
(Contract NAS7-918)
(NASA-CASE-NPO-17629-1-CU; NAS 1.71:NPO-17629-1-CU; US-PATENT-APPL-SN-458280) Avail: NTIS HC A03/MF A01 CSCL 09B

This is a real-time robotic controller and simulator which is a MIMD-SIMD parallel architecture for interfacing with an external host computer and providing a high degree of parallelism in computations for robotic control and simulation. It includes a host processor for receiving instructions from the external host computer and for transmitting answers to the external host computer. There are a plurality of SIMD micro-processors, each SIMD processor being a SIMD parallel processor capable of exploiting fine grain parallelism and further being able to operate asynchronously to form a MIMD architecture. Each SIMD processor comprises a SIMD architecture capable of performing two matrix-vector operations in parallel while fully exploiting parallelism in each operation. There is a system bus connecting the host processor to the plurality of SIMD micro-processors and a common clock providing a continuous sequence of clock pulses. There is also a ring structure interconnecting the plurality of SIMD micro-processors and connected to the clock for providing the clock pulses to the SIMD micro-processors and for providing a path for the flow of data and instructions between the SIMD micro-processors. The host processor includes logic for controlling the RRCS by interpreting instructions sent by the external host computer, decomposing the instructions into a series of computations to be performed by the SIMD micro-processors, using the system bus to distribute associated data among the SIMD micro-processors, and initiating activity of the SIMD micro-processors to perform the computations on the data by procedure call.

NASA



61

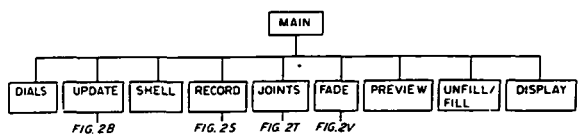
COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms, and specific applications, e.g., CAD/CAM.

N90-27340*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
GENERATION OF ANIMATION SEQUENCES OF THREE DIMENSIONAL MODELS Patent Application
SHARON POI, inventor (to NASA) and BRAD N. BELL, inventor (to NASA) (Barrios Technology, Inc., Houston, TX.) 28 Jun. 1990 36 p
(NASA-CASE-MSC-21379-1-SB; NAS 1.71:MSC-21379-1-SB; US-PATENT-APPL-SN-545170) Avail: NTIS HC A03/MF A01 CSCL 09B

The invention is directed toward a method and apparatus for generating an animated sequence through the movement of three-dimensional graphical models. A plurality of pre-defined graphical models are stored and manipulated in response to interactive commands or by means of a pre-defined command file. The models may be combined as part of a hierarchical structure to represent physical systems without need to create a separate model which represents the combined system. System motion is simulated through the introduction of translation, rotation and scaling parameters upon a model within the system. The motion is then transmitted down through the system hierarchy of models in accordance with hierarchical definitions and joint movement limitations. The present invention also calls for a method of editing hierarchical structure in response to interactive commands or a command file such that a model may be included, deleted, copied or moved within multiple system model hierarchies. The present invention also calls for the definition of multiple viewpoints or cameras which may exist as part of a system hierarchy or as an independent camera. The simulated movement of the models and systems is graphically displayed on a monitor and a frame is recorded by means of a video controller. Multiple movement and hierarchy manipulations are then recorded as a sequence of frames which may be played back as an animation sequence on a video cassette recorder.

NASA

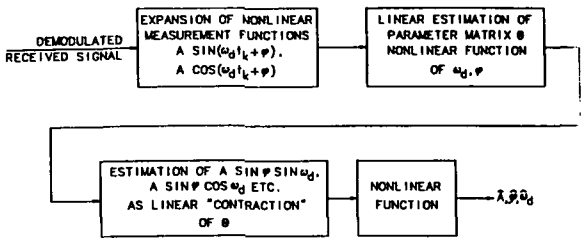


N90-27341*# National Aeronautics and Space Administration. Pasadena Office, CA.
MODIFIED FAST FREQUENCY ACQUISITION VIA ADAPTIVE LEAST SQUARES ALGORITHM Patent Application
RAJENDRA KUMAR, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 15 May 1990 25 p
(Contract NAS7-918)
(NASA-CASE-NPO-17845-1-CU; NAS 1.71:NPO-17845-1-CU; US-PATENT-APPL-SN-523692) Avail: NTIS HC A03/MF A01 CSCL 09B

This is a method and associated apparatus for accurately and quickly estimating the amplitude, frequency and phase of a signal of interest. The method comprises the steps of, inputting the signal of interest; generating a reference signal with adjustable amplitude, frequency and phase at an output thereof; mixing the signal of interest with the reference signal and a signal 90 deg out of phase with the reference signal to provide a pair of quadrature sample signals comprising respectively a difference between the signal of interest and the reference signal and a difference between the signal of interest and the signal 90 deg out of phase with the reference signal; using the pair of quadrature sample signals to compute estimates of the amplitude, frequency, and phase of an error signal comprising the difference between the signal of interest and the reference signal employing a least squares estimation; adjusting the amplitude, frequency, and phase of the reference signal from the numerically controlled oscillator in a manner which drives the error signal towards zero; and, outputting the estimates of the amplitude, frequency, and phase of the reference signal from the numerically controlled oscillator in a manner which drives the error signal towards zero; and, outputting the estimates of the amplitude, frequency, and phase of the error signal in combination with the reference signal to

produce a best estimate of the amplitude, frequency, and phase of the signal of interest. The preferred method includes the step of providing the error signal as a real time confidence measure as to accuracy of the estimates wherein the closer the error signal is to zero, the higher the probability that the estimates are accurate. A matrix in the estimation algorithm provides an estimate of the variance of the estimation error.

NASA



62

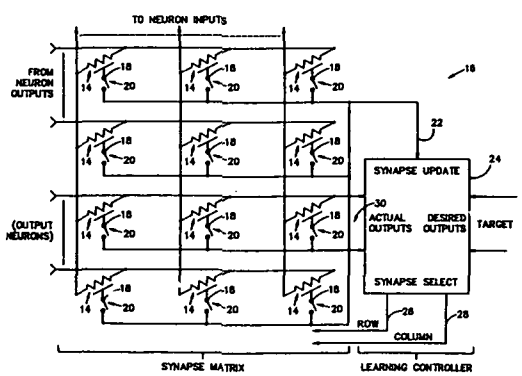
COMPUTER SYSTEMS

Includes computer networks and special application computer systems.

N90-27384*# National Aeronautics and Space Administration. Pasadena Office, CA.
ANALOG HARDWARE FOR LEARNING NEURAL NETWORKS Patent Application
SILVIO P. EBERHART, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Dec. 1989 19 p
(Contract NAS7-918)
(NASA-CASE-NPO-17664-1-CU; NAS 1.71:NPO-17664-1-CU; US-PATENT-APPL-SN-463720) Avail: NTIS HC A03/MF A01 CSCL 09B

This is a recurrent or feedforward analog neural network processor having a multi-level neuron array and a synaptic matrix for storing weighted analog values of synaptic connection strengths which is characterized by temporarily changing one connection strength at a time to determine its effect on system output relative to the desired target. That connection strength is then adjusted based on the effect, whereby the processor is taught the correct response to training examples connection by connection.

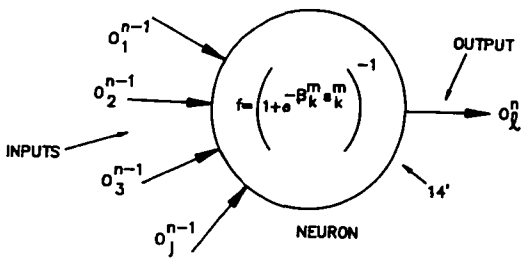
NASA



N90-27385*# National Aeronautics and Space Administration. Pasadena Office, CA.
NEURAL NETWORK WITH DYNAMICALLY ADAPTABLE NEURONS Patent Application
RAOUL TAWEL, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 31 Jan. 1990 28 p
(Contract NAS7-918)
(NASA-CASE-NPO-17803-1-CU; NAS 1.71:NPO-17803-1-CU; US-PATENT-APPL-SN-473024) Avail: NTIS HC A03/MF A01 CSCL 09B

This invention is an adaptive neuron for use in neural network processors. The adaptive neuron participates in the supervised learning phase of operation on a co-equal basis with the synapse matrix elements by adaptively changing its gain in a similar manner to the change of weights in the synapse elements. In this manner, training time is decreased by as much as three orders of magnitude.

NASA



72

ATOMIC AND MOLECULAR PHYSICS

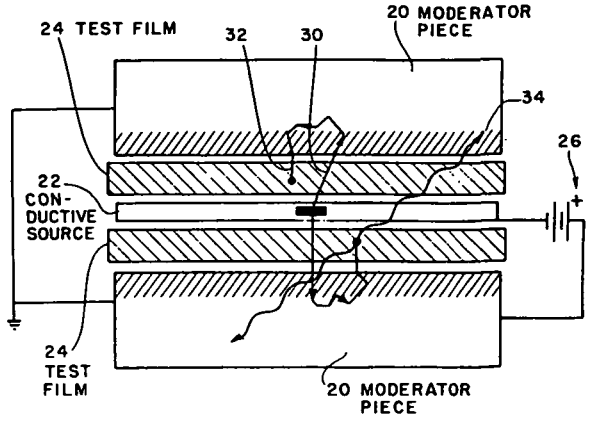
Includes atomic structure, electron properties, and molecular spectra.

N90-27472*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SLOW POSITRON BEAM GENERATOR FOR LIFETIME STUDIES Patent Application
JAG J. SINGH, inventor (to NASA), ABE EFTEKHARI, inventor (to NASA) (Analytical Services and Materials, Inc., Hampton, VA.), and TERRY L. ST.CLAIR, inventor (to NASA) 31 May 1990 21 p
(NASA-CASE-LAR-14250-1-SB; NAS 1.71:LAR-14250-1-SB; US-PATENT-APPL-SN-531372) Avail: NTIS HC A03/MF A01 CSCL 20H

A slow positron beam generator uses a conductive source residing between two test films. Moderator pieces are placed next to the test film on the opposite side of the conductive source. A voltage potential is applied between the moderator pieces and the conductive source. Incident energetic positrons are, first, emitted from the conductive source, second, passed through test film, and then, third, isotropically strike moderator pieces before diffusing out of the moderator pieces as slow positrons. The slow positrons diffusing out of moderator pieces are attracted to the conductive source which is held at an appropriate potential below the moderator pieces. The slow positrons have to pass through the test films before reaching the conductive source. A voltage is adjusted so that the potential difference between the moderator pieces and the conductive source forces the positrons to stop in the test films. Measurable annihilation radiation is emitted from

the test film when positrons annihilate (combine) with electrons in the test film.

NASA



74

OPTICS

Includes light phenomena; and optical devices.

N90-22383* National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, FL.

OPTICAL SHUTTER SWITCHING MATRIX Patent

CHARLES H. GROVE, inventor (to NASA) 20 Mar. 1990 12 p Filed 21 Oct. 1988

(NASA-CASE-KSC-11392-1; US-PATENT-4,910,396; US PATENT-APPL-SN-262851; US-PATENT-CLASS-250-229; US-PATENT-CLASS-350-356) Avail: US Patent and Trademark Office CSCL 20F

A switching matrix enables switching of optical signals from any of a plurality of optical input paths to selected optical output paths, without requiring physical reconnecting of the inputs or outputs. Plural broadband optical waveguides are defined preferably in otherwise non-transmissive quartz crystalline wafers, to provide relatively high signal isolation. The wafers are fused to electronic shutter windows situated in an array and discretely operable under processor x-y address control. Optical signals passed through actuated electronic shutter windows are summed in output wafers, having waveguide structure generally reverse to that of the input quartz wafers. Through selected segment actuation, optical signals from selected optical input paths may be transmitted or blocked at the electronically controlled shutter array, for being output on selected optical output paths. Alternatively, fiber optic bundles may replace input or output quartz wafers. The switching matrix is useful as a switching module which may be variously associated in series and/or parallel connections for obtaining a desired number of switching channels, and required levels of signal separation therewith. Input/output signal characteristics and parameters are maintained by power summation at the outputs with automatic gain control, regardless of the number of paths or the like selectively summed in a given output. Connectors may be used in conjunction with the optical input and output paths, whereby both electrical and optical signals may be switched. Various modules may include converters as built-in features, so as to meet particular applications.

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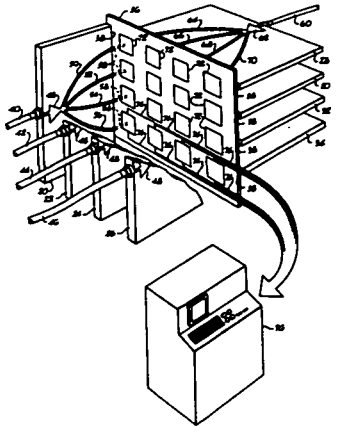


N90-27487*# National Aeronautics and Space Administration. Pasadena Office, CA.

ALL-OPTICAL PHOTOCHROMIC SPATIAL LIGHT MODULATORS BASED ON PHOTOINDUCED ELECTRON TRANSFER IN RIGID MATRICES Patent Application

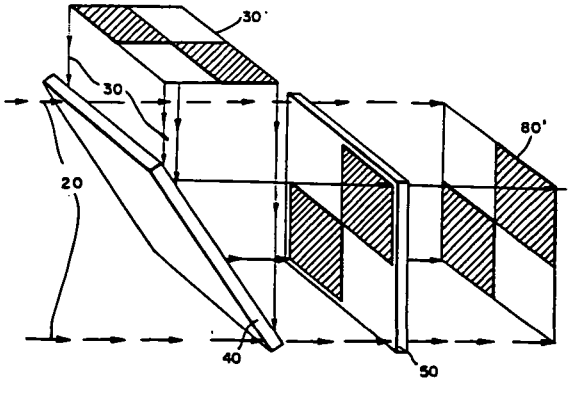
DAVID N. BERATAN, inventor (to NASA) and JOSEPH W. PERRY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 15 Feb. 1990 26 p

(Contract NAS7-918)

(NASA-CASE-NPO-17612-1-CU; NAS 1.71:NPO-17612-1-CU; US-PATENT-APPL-SN-480385) Avail: NTIS HC A03/MF A01 CSCL 20F

A single material (not a multi-element structure) spatial light modulator may be written to, as well as read out from, using light. The device has tailored arise and hold times dependent on the composition and concentration of the molecular species used as the active components. The spatial resolution of this device is limited only by light diffraction as in volume holograms. The device may function as a two-dimensional mask (transmission or reflection) or as a three-dimensional volume holographic medium. This device is able to perform incoherent to coherent image conversion or wavelength conversion over a wide spectral range (ultraviolet, visible, or near-infrared regions).

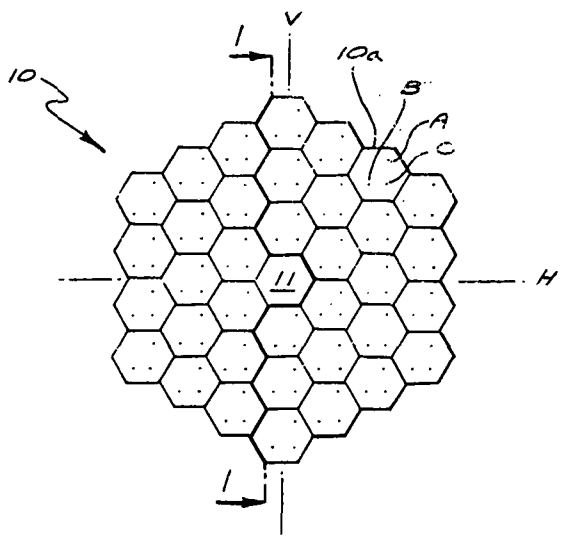
NASA



N90-27488*# National Aeronautics and Space Administration. Pasadena Office, CA.
EQUAL PATH, PHASE SHIFTING, SAMPLE POINT INTERFEROMETER FOR MONITORING THE CONFIGURATION OF SURFACES Patent Application
PAUL K. MANHART, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 23 May 1990 16 p (Contract NAS7-918)
(NASA-CASE-NPO-17913-1-CU; NAS 1.71:NPO-17913-1-CU; US-PATENT-APPL-SN-527509) Avail: NTIS HC A03/MF A01 CSCL 20F

A system for monitoring the configuration of a surface (e.g., a segmented parabolic surface) using orthogonally placed retroreflectors at sets of points 1, 2, and 3 dispersed throughout the surface with a stationary halfwave plate (HWP) in the front of the one retroreflector at a corner point 3 and a rotating halfwave plate (RHWP) over a source of linearly polarized coherent light, thereby causing the direction of linear polarization to continuously rotate through 360 deg and causing light returned by the retroreflector at point 3 to be continuously phase shifted through 360 deg relative to light returned by retroreflectors at points 1 and 3. The returned light from each set of points 1, 2, and 3 is focused onto a bed-of-nails (BON) phase grating diagonally oriented with respect to the orthogonal orientation of the incident beams from retroreflectors 1, 2, and 3, thereby causing overlap in the light from points 1 and 3 to produce interferometric signals 1,2 and 2,3. Any change in phase of the interferometric signals 1,2 and 2,3 indicates both the magnitude and direction of any change in the position of the retroreflector at point 3 relative to retroreflectors at points 1 and 2.

NASA



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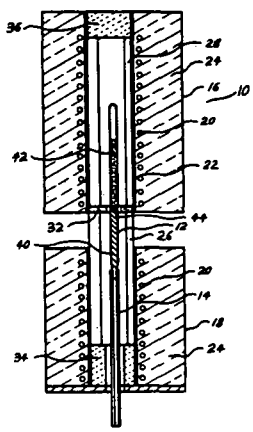
SOLID-STATE PHYSICS

Includes superconductivity.

N90-20896* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
METHOD OF PREPARING RADIALLY HOMOGENEOUS MERCURY CADMIUM TELLURIDE CRYSTALS Patent
SANDOR L. LEHOCZKY, inventor (to NASA) and FRANK R. SZOFRAN, inventor (to NASA) 5 Sep. 1989 6 p Filed 17 Dec. 1985 Continuation of US Patent-Appl-SN-441896, filed 15 Nov. 1982, abandoned
(NASA-CASE-MFS-25786-2; US-PATENT-4,863,553; US-PATENT-APPL-SN-811309; US-PATENT-CLASS-156-616.41; US-PATENT-CLASS-156-616.4; US-PATENT-CLASS-422-249; US-PATENT-APPL-SN-441896) Avail: US Patent and Trademark Office CSCL 20L

Hg(1-x)Cd(x)Te is prepared in an improved directional solidification method in which a precast alloy sample containing predetermined amounts of Hg, Cd, and Te is disposed in a sealed ampule and a furnace providing two controlled temperature zones is translated upward past the ampule to provide melting and resolidification. The present improvement is directed to maintaining the zones at temperatures determined in accordance with a prescribed formula providing a thermal barrier between the zones with a maximum thickness and translating the furnace past the zones at a rate less the 0.31 micron/sec.

Official Gazette of the U.S. Patent and Trademark Office

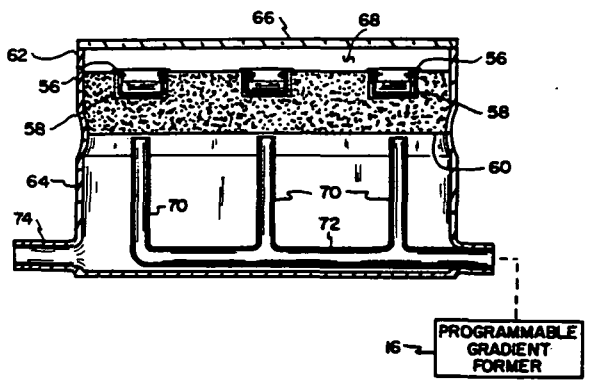


N90-23242* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
HANGING DROP CRYSTAL GROWTH APPARATUS AND METHOD Patent
DANIEL C. CARTER, inventor (to NASA) and ROBBIE SMITH, inventor (to NASA) (Tennessee Scientific Glass Co.) 12 Dec. 1989 11 p Filed 23 Mar. 1988 Supersedes N88-25356 (26 - 18, p 2585)
(NASA-CASE-MFS-28206-1-SB; US-PATENT-APPL-SN-172101; US-PATENT-CLASS-422-245; US-PATENT-CLASS-156-DIG.62; US-PATENT-CLASS-156-DIG.72; US-PATENT-CLASS-156-608; US-PATENT-CLASS-156-600; INT-PATENT-CLASS-C30B-7/02; US-Patent-4,886,646) Avail: US Patent and Trademark Office CSCL 20L

This invention relates generally to hanging drop crystal growth devices and methods, and more particularly to such a device wherein the drop containing protein to be crystallized is exposed to vapor from a flow of control fluid, with this control fluid having a vapor pressure which varies as solvent is drawn from the drop. A hanging drop apparatus is constructed having a cylindrical enclosure, with a wicking element or disc constructed of sintered

glass and being mounted in an upper portion thereof. A well or recess is cut into an upper side of the disc. A cover slip or plate having a protein drop disposed thereon is sealably positioned on the disc, with the drop being positioned in the well. A flow of control fluid is generated by a programmable gradient former, with this flow being coupled to the disc. The vapor pressure of the control fluid is initially selected to be considerably lower than that of the drop, causing solvent in the drop to readily evaporate. As evaporation progresses, the vapor pressure of the control fluid is adjusted to slow the rate of evaporation from the drop, allowing a slow approach to the critical supersaturation point of the protein to be crystallized. The novelty of this invention particularly lies in exposing the drop to a control fluid having a variable pressure. Further novelty lies in the particular apparatuses and methods by which this is accomplished.

Official Gazette of the U.S. Patent and Trademark Office



N90-24150* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

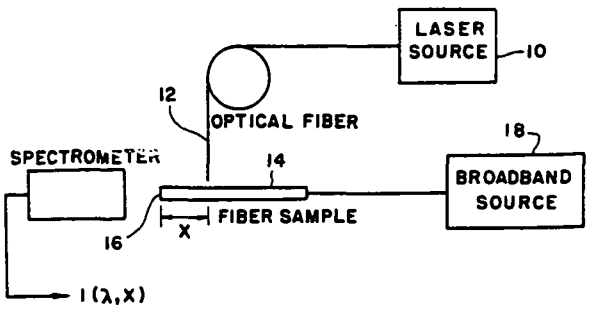
METHOD AND APPARATUS FOR DETERMINING OPTICAL ABSORPTION AND EMISSION CHARACTERISTICS OF A CRYSTAL OR NON-CRYSTALLINE FIBER Patent

CHARLES E. BYVIK, inventor (to NASA) and A. MARTIN BUONCRISTIANI, inventor (to NASA) (Buoncristiani, A. Martin, Newport News, VA) 2 Jan. 1990 8 p Filed 16 Aug. 1988 Supersedes N89-14119 (27 - 5, p 703)

(NASA-CASE-LAR-13963-1; US-PATENT-4,890,915; US-PATENT-APPL-SN-232735; US-PATENT-CLASS-356-73; US-PATENT-CLASS-356-73.1; INT-PATENT-CLASS-G01N-21/64; INT-PATENT-CLASS-G01N-21/84) Avail: US Patent and Trademark Office CSCL 20L

This invention relates generally to spectroscopy and, more particularly, to a method and apparatus for performing spectroscopic analysis of crystal and noncrystalline fibers. The invention provides a complete absorption curve for a material using a crystal fiber which can be more easily produced than the types of samples required for other methods of obtaining substantially the same absorption curve for identical materials.

Official Gazette of the U.S. Patent and Trademark Office



N90-24168* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

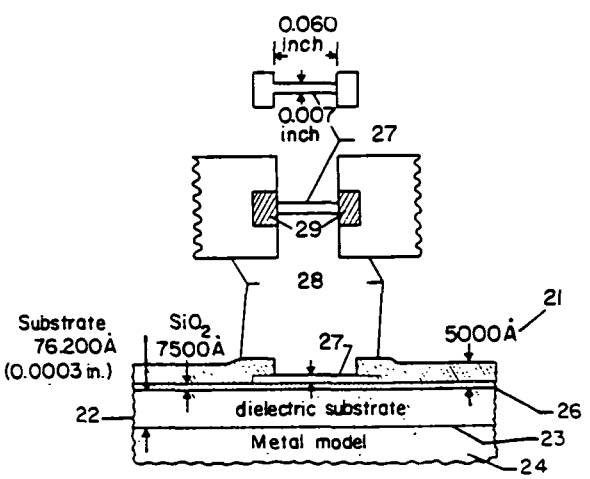
METHOD OF FORMING A MULTIPLE LAYER DIELECTRIC AND A HOT FILM SENSOR THEREWITH Patent

PURNELL HOPSON, JR., inventor (to NASA) and SANG Q. TRAN, inventor (to NASA) 17 Apr. 1990 9 p Filed 1 Apr. 1988 Supersedes N88-25355 (26 - 18, p 2584)

(NASA-CASE-LAR-13678-1; US-PATENT-4,917,940; US-PATENT-APPL-SN-176547; US-PATENT-CLASS-428-216; US-PATENT-CLASS-340-692; US-PATENT-CLASS-428-450; US-PATENT-CLASS-428-457; US-PATENT-CLASS-428-901; INT-PATENT-CLASS-B32B-7/02; INT-PATENT-CLASS-B32B-15/08) Avail: US Patent and Trademark Office CSCL 20L

The invention is a method of forming a multiple layer dielectric for use in a hot-film laminar separation sensor. The multiple layer dielectric substrate is formed by depositing a first layer of a thermoelastic polymer such as on an electrically conductive substrate such as the metal surface of a model to be tested under cryogenic conditions and high Reynolds numbers. Next, a second dielectric layer of fused silica is formed on the first dielectric layer of thermoplastic polymer. A resistive metal film is deposited on selected areas of the multiple layer dielectric substrate to form one or more hot-film sensor elements to which aluminum electrical circuits deposited upon the multiple layered dielectric substrate are connected.

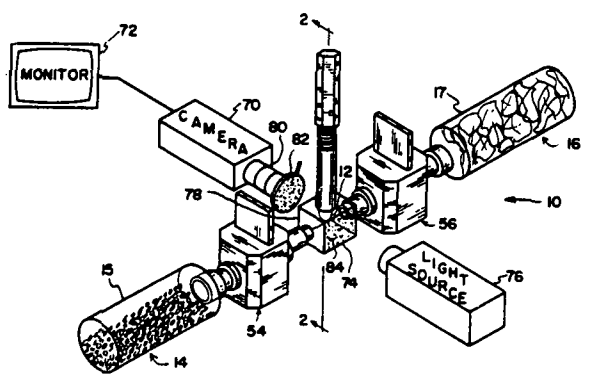
Official Gazette of the U.S. Patent and Trademark Office



N90-24169* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
CRYSTAL GROWTH APPARATUS Patent
FREDERICK T. HERRMANN, inventor (to NASA) and BLAIR J. HERREN, inventor (to NASA) 24 Apr. 1990 9 p Filed 29 Feb. 1988 Supersedes N88-25357 (26 - 18, p 2585)
(NASA-CASE-MFS-28182-1; US-PATENT-4,919,899; US-PATENT-APPL-SN-161681; US-PATENT-CLASS-422-245; US-PATENT-CLASS-156-600; US-PATENT-CLASS-156-601; US-PATENT-CLASS-156-607; US-PATENT-CLASS-156-DIG.62; US-PATENT-CLASS-156-DIG.113; US-PATENT-CLASS-422-50)
Avail: US Patent and Trademark Office CSCL 20L

This invention relates generally to crystal growth devices, and more particularly to a device in which protein crystals are grown in a hanging drop. The drop is suspended from a surface positioned in the interior of an enclosure which is sealably coupled via a valve to a vessel containing solvent used in the drop. A second opening in the enclosure is coupled via a valve to a vessel containing a selected desiccant material. The valve may be fully or partially opened to add a selected quantity of solvent in a vapor phase to the drop, and the valve may be fully or partially opened to cause a selected quantity of solvent to evaporate from the drop. The process is monitored by a camera, and in conjunction with a graduated pattern superimposed over the drop, relative volumes of the drop are determined. Alternately, the process may be automated by using a computer coupled to servo motors, which in turn are coupled to and operate a cap and valves, respectively. The computer is responsive to a detection device which detects changes of light passing through the drop from the light source.

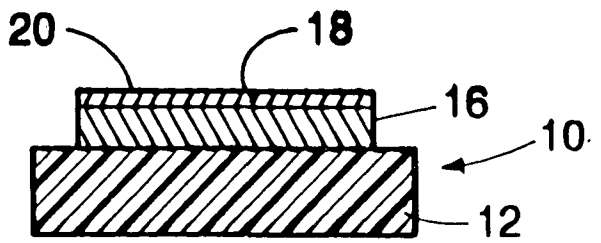
Official Gazette of the U.S. Patent and Trademark Office



N90-26684*# National Aeronautics and Space Administration. Pasadena Office, CA.
PASSIVATION OF HIGH TEMPERATURE SUPERCONDUCTORS Patent Application
RICHARD P. VASQUEZ, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Jun. 1990 25 p
(Contract NAS7-918)
(NASA-CASE-NPO-17949-1-CU; NAS 1.71:NPO-17949-1-CU; US-PATENT-APPL-SN-545016) Avail: NTIS HC A03/MF A01 CSCL 20L

The surfaces of high temperature superconductors such as YBa(2)Cu(3)O(7-x) are passivated by reacting the native Y, Ba and Cu metal ions with an anion such as sulfate or oxalate to form a surface film that is impervious to water and has a solubility in water of no more than 10(exp -3) M. The passivating treatment is preferably conducted by immersing the surface in dilute aqueous acid solution since more soluble species dissolve into the solution. The treatment does not degrade the superconducting properties of the bulk material.

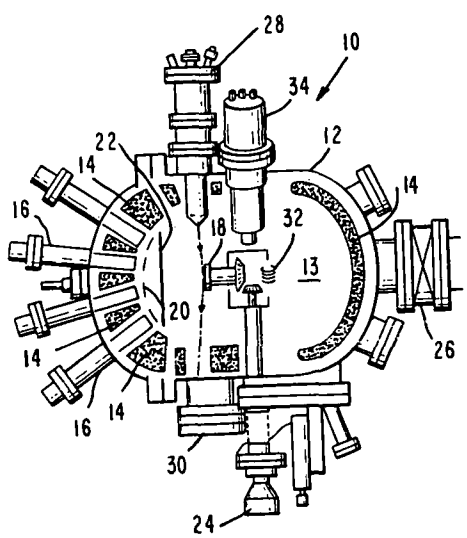
NASA



N90-26685*# National Aeronautics and Space Administration. Pasadena Office, CA.
MBE GROWTH TECHNOLOGY FOR HIGH QUALITY STRAINED III-V LAYERS Patent Application
FRANK J. GRUNTHANER, inventor (to NASA), JOHN K. LIU, inventor (to NASA), and BRUCE R. HANCOCK, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 30 Mar. 1990 12 p
(Contract NAS7-918)
(NASA-CASE-NPO-17723-1-CU; NAS 1.71:NPO-17723-1-CU; US-PATENT-APPL-SN-506137) Avail: NTIS HC A03/MF A01 CSCL 20L

The III-V films are grown on large automatically perfect terraces of III-V substrates which have a different lattice constant, with temperature and Group III and V arrival rates chosen to give a Group III element stable surface. The growth is pulsed to inhibit Group III metal accumulation of low temperature, and to permit the film to relax to equilibrium. The method of the invention: (1) minimizes starting step density on sample surface; (2) deposits InAs and GaAs using an interrupted growth mode (0.25 to 2 monolayers at a time); (3) maintains the instantaneous surface stoichiometry during growth (As-stable for GaAs, In-stable for InAs); and (4) uses time-resolved RHEED to achieve aspects (1) through (3).

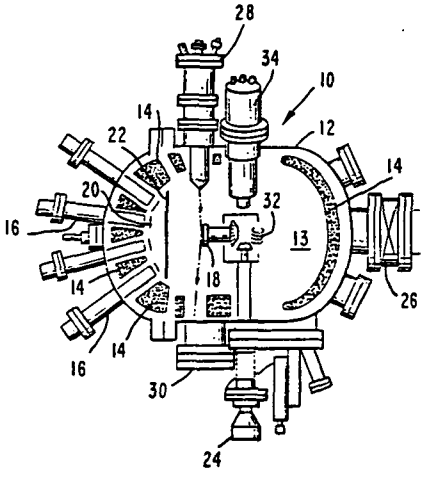
NASA



N90-27517*# National Aeronautics and Space Administration. *Pasadena Office, CA.*
GROWTH OF III-V FILMS BY CONTROL OF MBE GROWTH FRONT STOICHIOMETRY Patent Application
FRANK J. GRUNTHANER, inventor (to NASA), JOHN K. LIU, inventor (to NASA), and BRUCE HANCOCK, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Feb. 1990 13 p
(Contract NAS7-918)
(NASA-CASE-NPO-17724-1-CU; NAS 1.71:NPO-17724-1-CU; US-PATENT-APPL-SN-488578) Avail: NTIS HC A03/MF A01 CSCL 20L

For the growth of strain-layer materials and high quality single and multiple quantum wells, the instantaneous control of growth front stoichiometry is critical. The process of the invention adjusts the offset or phase of molecular beam epitaxy (MBE) control shutters to program the instantaneous arrival or flux rate of In and As4 reactants to grow InAs. The interrupted growth of first In, then As4, is also a key feature.

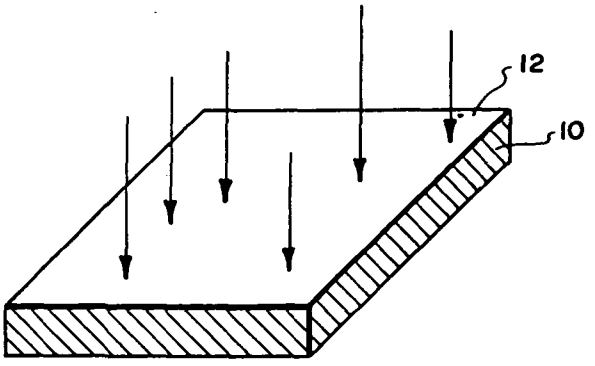
NASA



N90-27518*# National Aeronautics and Space Administration. *Pasadena Office, CA.*
METHOD OF FORMING THREE-DIMENSIONAL SEMICONDUCTOR STRUCTURES Patent Application
ROBERT W. FATHAUER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 18 May 1990 15 p
(Contract NAS7-918)
(NASA-CASE-NPO-17835-1-CU; NAS 1.71:NPO-17835-1-CU; US-PATENT-APPL-SN-524959) Avail: NTIS HC A03/MF A01 CSCL 20L

Silicon and metal are coevaporated onto a silicon substrate in a molecular beam epitaxy system with a larger than stoichiometric amount of silicon so as to epitaxially grow columns of metal silicide embedded in a matrix of single crystal, epitaxially grown silicon. Higher substrate temperatures and lower deposition rates yield larger columns that are farther apart while more silicon produces smaller columns. Column shapes and locations are selected by seeding the substrate with metal silicide starting regions. A variety of three-dimensional, exemplary electronic devices are disclosed.

NASA



89

ASTRONOMY

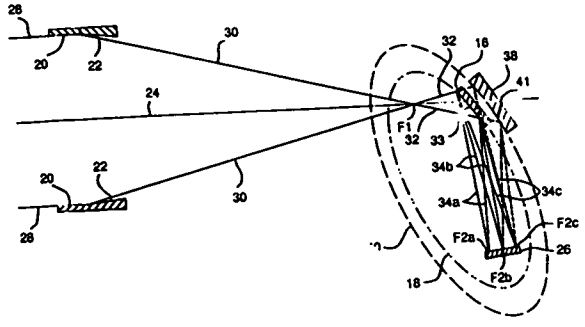
Includes radio, gamma-ray, and infrared astronomy; and astrometry.

N90-27594*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
VARIABLE MAGNIFICATION VARIABLE DISPERSION GLANCING INCIDENCE IMAGING X RAY SPECTROSCOPIC TELESCOPE Patent Application
RICHARD HOOVER, inventor (to NASA) 28 Jun. 1990 37 p
(NASA-CASE-MFS-28013-3; NAS 1.71:MFS-28013-3; US-PATENT-APPL-SN-545089) Avail: NTIS HC A03/MF A01 CSCL 03A

A variable magnification variable dispersion glancing incidence x ray spectroscopic telescope capable of multiple high spatial revolution imaging at precise spectral lines of solar and stellar x ray and extreme ultraviolet radiation sources includes a primary optical system which focuses the incoming radiation to a primary focus. Two or more rotatable carriers each providing a different magnification are positioned behind the primary focus at an inclination to the optical axis, each carrier carrying a series of ellipsoidal diffraction grating mirrors each having a concave surface on which the gratings are ruled and coated with a multilayer coating to reflect by diffraction a different desired wavelength. The diffraction grating mirrors of both carriers are segments of ellipsoids having a common first focus coincident with the primary focus. A contoured detector such as an x ray sensitive photographic film is positioned at the second respective focus of each diffraction grating so that each grating may reflect the image at the first focus to the detector at the second focus. The carriers are selectively rotated to position a selected mirror for receiving radiation from the primary optical system, and at least the first carrier may be

withdrawn from the path of the radiation to permit a selected grating on the second carrier to receive radiation.

NASA



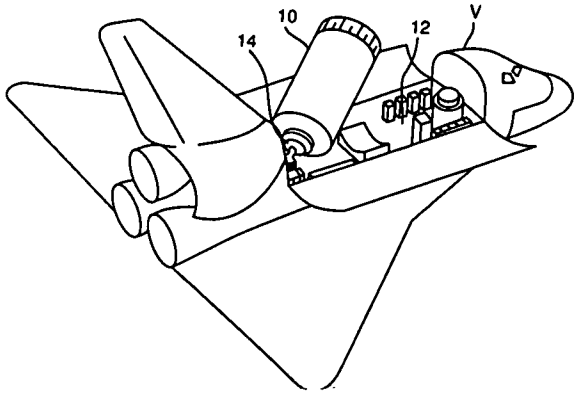
N90-27595*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

MULTISPECTRAL VARIABLE MAGNIFICATION GLANCING INCIDENCE X RAY TELESCOPE Patent Application

RICHARD HOOVER, inventor (to NASA) 28 Jun. 1990 30 p (NASA-CASE-MFS-28013-4; NAS 1.71:MFS-28013-4; US-PATENT-APPL-SN-545008) Avail: NTIS HC A03/MF A01 CSCL 03A

A multispectral variable magnification glancing incidence x ray telescope capable of broadband, high resolution imaging of solar and stellar x ray and extreme ultraviolet radiation sources includes a primary optical system which focuses the incoming radiation to a primary focus. Two or more rotatable mirror carriers each providing a different magnification are positioned behind the primary focus at an inclination to the optical axis, each carrier carrying a series of ellipsoidal mirrors each having a concave surface coated with a multilayer (layered synthetic microstructure) coating to reflect a different desired wavelength. The mirrors of both carriers are segments of ellipsoids having a common first focus coincident with the primary focus. A detector such as an x ray sensitive photographic film is positioned at the second respective focus of each mirror so that each mirror may reflect the image at the first focus to the detector at the second focus. The carriers are selectively rotated to position a selected mirror for receiving radiation from the primary optical system, and at least the first carrier may be withdrawn from the path of the radiation to permit a selected mirror on the second carrier to receive the radiation.

NASA



PUBLIC AVAILABILITY OF COPIES OF PATENTS AND PATENT APPLICATIONS

Copies of U.S. patents may be purchased directly from the U.S. Patent and Trademark Office, Washington, D.C. 20231 at $1.50 per copy. When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office.

NASA *patent application specifications* are sold in paper copy and microfiche by the National Technical Information Service. The US-Patent-Appl-SN-number should be used in ordering either paper copy or microfiche from NTIS.

LICENSES FOR COMMERCIAL USE: INQUIRIES AND APPLICATIONS FOR LICENSE

NASA inventions, abstracted in *NASA PAB,* are available for nonexclusive or exclusive licensing in accordance with the NASA Patent Licensing Regulations. It is significant that all licenses for NASA inventions shall be by express written instruments and that no license will be granted or implied in a NASA invention except as provided in the NASA Patent Licensing Regulations.

Inquiries concerning the NASA Patent Licensing Program or the availability of licenses for the commercial use of NASA-owned inventions covered by U.S. patents or pending applications for patent should be forwarded to the NASA Patent Counsel of the NASA installation having cognizance of the specific invention, or the Associate General Counsel for Intellectual Property, code GP, National Aeronautics and Space Administration, Washington, D.C. 20546. Inquiries should refer to the NASA Case Number, the Title of the Invention, and the U.S. Patent Number or the U.S. Application Serial Number assigned to the invention as shown in *NASA PAB.*

The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table.

STANDING ORDER SUBSCRIPTIONS

NASA SP-7039, Section 1 and its supplements are available from the National Technical Information Service (NTIS) on standing order subscription as PB 90-911100 at the price of $15.00 domestic and $30.00 foreign. Standing order subscriptions do not terminate at the end of a year, as do regular subscriptions, but continue indefinitely unless specifically terminated by the subscriber.

NASA Case *Number* Prefix Letters	**Address of Cognizant *NASA Patent Counsel***
ARC-xxxxx XAR-xxxxx	Ames Research Center Mail Code: 200-11A Moffett Field, California 94035 Telephone: (415) 694-5104
ERC-xxxxx XER-xxxxx HQN-xxxxx XHQ-xxxxx	NASA Headquarters Mail Code: GP Washington, D.C. 20546 Telephone: (202) 453-2417
GSC-xxxxx XGS-xxxxx	Goddard Space Flight Center Mail Code: 204 Greenbelt, Maryland 20771 Telephone: (301) 286-7351
KSC-xxxxx XKS-xxxxx	John F. Kennedy Space Center Mail Code: PT-PAT Kennedy Space Center, Florida 32899 Telephone: (305) 867-2544
LAR-xxxxx XLA-xxxxx	Langley Research Center Mail Code: 279 Hampton, Virginia 23365 Telephone: (804) 865-3725
LEW-xxxxx XLE-xxxxx	Lewis Research Center Mail Code: 500-318 21000 Brookpark Road Cleveland, Ohio 44135 Telephone: (216) 433-5753
MSC-xxxxx XMS-xxxxx	Lyndon B. Johnson Space Center Mail Code: AL3 Houston, Texas 77058 Telephone: (713) 483-4871
MFS-xxxxx XMF-xxxxx	George C. Marshall Space Flight Center Mail Code: CC01 Huntsville, Alabama 35812 Telephone: (205) 544-0024
NPO-xxxxx XNP-xxxxx FRC-xxxxx XFR-xxxxx WOO-xxxxx	NASA Resident Legal Office Mail Code: 180-801 4800 Oak Grove Drive Pasadena, California 91103 Telephone: (818) 354-2700

PATENT LICENSING REGULATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

14 CFR Part 1245

Licensing of NASA Inventions

AGENCY: National Aeronautics and Space Administration
ACTION: Interim regulation with comments requested.

SUMMARY: The National Aeronautics and Space Administration (NASA) is revising its patent licensing regulations to conform with Pub. L. 96-517. This interim regulation provides policies and procedures applicable to the licensing of federally owned inventions in the custody of the National Aeronautics and Space Administration, and implements Pub. L. 96-517. The object of this subpart is to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

EFFECTIVE DATE: July 1, 1981. Comments must be received in writing by December 2, 1981. Unless a notice is published in the **Federal Register** after the comment period indicating changes to be made, this interim regulation shall become a final regulation.

ADDRESS: Mr. John G. Mannix, Director of Patent Licensing, GP-4, NASA, Washington, D.C. 20546

FOR FURTHER INFORMATION CONTACT:
Mr. John G. Mannix, (202) 755-3954.

SUPPLEMENTARY INFORMATION:

PART 1245—PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

Subpart 2 of Part 1245 is revised to read as follows:

* * * * *

Subpart 2—Licensing of NASA Inventions

Sec.

Restrictions and Conditions

Types of Licenses

Procedures

Authority: 35 U.S.C. Section 207 and 208.94 Stat 3023 and 3024.

* * * * *

Subpart 2—Licensing of NASA Inventions

§ 1245.200 Scope of subpart.

This subpart prescribes the terms, conditions and procedures upon which a NASA invention may be licensed. It does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government's acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

§ 1245.201 Policy and objective.

It is the policy and objective of this subpart to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

§ 1245.202 Definitions

(a) "Federally owned invention" means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.

(b) "Federal agency" means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a Federally owned invention.

(c) "NASA Invention" means a Federally owned invention with respect to which NASA maintains custody and administration, in whole or in part, of the right, title or interest in such invention on behalf of the United States Government.

(d) "Small business firm" means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of these regulations, the size standard for small business concerns involved in Government procurement, contained in 13 CFR 121.3-8, and in subcontracting, contained in 13 CFR 121.3-12, will be used.

(e) "Practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such condition, as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

(f) "United States" means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

§ 1245.203 Authority to grant licenses.

NASA inventions shall be made available for licensing as deemed appropriate in the public interest. NASA may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this subpart on inventions in its custody.

Restrictions and Conditions

§ 1245.204 All licenses granted under this subpart.

(a) *Restrictions.* (1) A license may be granted only if the applicant has supplied NASA with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

(2) A license granting rights to use or sell under a NASA invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.

(b) *Conditions.* Licenses shall contain such terms and conditions as NASA determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this subpart. The following terms and conditions apply to any license:

(1) The duration of the license shall be for a period specified in the license agreement, unless sooner terminated in accordance with this subpart.

(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of NASA, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The license may provide the licensee the right to grant sublicenses under the license, subject to the approval of NASA. Each sublicense shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to NASA.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) All licenses shall normally require royalties or other consideration.

(8) Where an agreement is obtained pursuant to § 1245.204(a)(2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall recite such agreement.

(9) The license shall provide for the right of NASA to terminate the license, in whole or in part, if:

(i) NASA determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of NASA that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) NASA determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this subpart, upon mutual agreement of NASA and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this subpart shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

Types of Licenses

§ 1245.205 Nonexclusive licenses.

(a) *Availability of licenses.* Nonexclusive licenses may be granted under NASA inventions without publication of availability or notice of a prospective license.

(b) *Conditions.* In addition to the provisions of § 1245.204, the nonexclusive license may also provide that, after termination of a period specified in the license agreement, NASA may restrict the license to the fields of use or geographic areas, or both, in which the licensee has brought the invention to practical application and continues to make the benefits of the invention reasonably accessible to the public. However, such restriction shall be made only in order to grant an exclusive or partially exclusive license in accordance with this subpart.

§ 1245.206 Exclusive and partially exclusive licenses.

(a) Domestic licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on NASA inventions: (i) 3 months after notice of the invention's availability has been announced in the **Federal Register;** or (ii) without such notice where NASA determines that expeditious granting of such a license will best serve the interests of the Federal Government and the public; and (iii) in either situation, specified in (a)(1)(i) or (ii) of this section only if:

(A) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the **Federal Register,** providing opportunity for filing written objections within a 60-day period;

(B) After expiration of the period in § 1245.206(a)(1)(iii)(A) and consideration of nay written objections received during the period, NASA has determined that:

(*1*) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilizaiton by the public;

(*2*) The desired practical application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(*3*) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(*4*) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(C) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(D) NASA has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to domestic exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to NASA the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) Foreign licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on a NASA invention covered by a foreign patent, patent application, or other form of protection, provided that:

(i) Notice of a prospective license, identifying the invention and prospective licensee, has been published in the **Federal Register,** providing opportunity for filing written objections within a 60-day period and following consideration of such objections;

(ii) NASA has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii) The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) *Record of determinations.* NASA shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

Procedures

§ 1245.207 Application for a license.

An application for a license should be addressed to the Patent Counsel at the NASA installation having responsibility for the invention and shall normally include:

(a) Identification of the invention for which the license is desired, including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(d) Name, address, and telephone number of representative of applicant to whom correspondence should be sent;

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether applicant is a small business firm as defined in § 1245.202(c);

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under Federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

§ 1245.208 Processing applications.

(a) Applications for licenses will be initially reviewed by the Patent Counsel of the NASA installation having responsibility for the invention. The Patent Counsel shall make a preliminary recommendation to the Director of Licensing, NASA Headquarters, whether to: (1) grant the license as requested, (2) grant the license with modification after negotiation with the licensee, or (3) deny the license. The Director of Licensing shall review the preliminary recommendation of the Patent Counsel and make a final recommendation to the NASA Assistant General Counsel for Patent Matters. Such review and final recommendation may include, and be based on, any additional information obtained from applicant and other sources that the Patent Counsel and the Director of Licensing deem relevant to the license requested. The determination to grant or deny the license shall be made by the Assistant General Counsel for Patent Matters based on the final recommendation of the Director of Licensing.

(b) When notice of a prospective exclusive or partially exclusive license is published in the **Federal Register** in accordance with § 1245.206(a)(1)(iii)(A) or § 1245.206(b)(1)(i), any written objections received in response thereto will be considered by the Director of Licensing in making the final recommendation to the Assistant General Counsel for Patent Matters.

(c) If the requested license, including any negotiated modifications, is denied by the Assistant General Counsel for Patent Matters, the applicant may request reconsideration by filing a written request for reconsideration within 30 days after receiving notice of denial. This 30-day period may be extended for good cause.

(d) In addition to, or in lieu of requesting reconsideration, the applicant may also appeal the denial of the license in accordance with § 1245.211.

§ 1245.209 Notice to Attorney General.

A copy of the notice provided for in §§ 1245.206(a)(1)(iii)(A), and 1245.206(b)(1)(i) will be sent to the Attorney General.

§ 1245.210 Modification and termination of licenses.

Before modifying or terminating a license, other than by mutual agreement, NASA shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license should not be modified or terminated.

§ 1245.211 Appeals.

(a) The following parties may appeal to the NASA Administrator or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(1) A person whose application for a license has been denied;

(2) A licensee whose license has been modified or terminated, in whole or in part; or

(3) A person who timely filed a written objection in response to the notice required by §§ 1245.206(a)(1)(iii)(A) or 1245.206(b)(1)(i) and who can demonstrate to the satisfaction of NASA that such person may be damaged by the Agency action.

(b) Written notice of appeal must be filed within 30 days (or such other time as may be authorized for good cause shown) after receiving notice of the adverse decision or determination; including, an adverse decision following the request for reconsideration under § 1245.208(c). The notice of appeal, along with all supporting documentation should be addressed to the Administrator, National Aeronautics and Space Administration, Washington, DC 20546. Should the appeal raise a genuine dispute over material facts, fact-finding will be conducted by the NASA Inventions and Contributions Board. The person filing the appeal shall be afforded an opportunity to be heard and to offer evidence in support of the appeal. The Chairperson of the Inventions and Contributions Board shall prepare written findings of fact and transmit them to the Administrator or designee. The decision on the appeal shall be made by the NASA Administrator or designee. There is no further right of administrative appeal from the decision of the Administrator or designee.

§ 1245.212 Protection and administration of inventions.

NASA may take any suitable and necessary steps to protect and administer rights to NASA inventions, either directly or through contract.

§ 1245.213 Transfer of custody.

NASA having custody of certain Federally owned inventions may transfer custody and administration in whole or in part, to another Federal agency, of the right, title, or interest in any such invention.

§ 1245.214 Confidentiality of information.

Title 35, United States Code, section 209, provides that any plan submitted pursuant to § 1245.207(h) and any report required by § 1245.204(b)(6) may be treated by NASA as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under section 552 of Title 5 of the United States Code.

James M. Beggs,

Administrator.

October 15, 1981.

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15. Supplementary Notes

Section 1: Abstracts

16. Abstract

Abstracts are provided for 132 patents and patent applications entered into the NASA scientific and technical information system during the period July 1990 through December 1990. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application.

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